PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

SEPTEMBER, 1929

SEP 19 1929

Journal of Educational Research

Registered June 4, 1929

CONTENTS

		Page
A Study of Juvenile Theft	*Harry J. Baker, Fred J. Decker, and Arthur S. Hill*	81
The Relation of the Home Factor to Achievement and Intelligence Test Scores	*Marlin R. Chauncey*	88
The Reliability and Validity of Four Types of Vocabulary Tests	*Verner M. Sims*	91
A Survey of Studies in Experimental Aesthetics	*R. Alice Drought*	97
The Vocabulary of American History	*A. S. Barr and C. W. Gifford*	103
Saving Time in Spelling Instruction	*C. P. Archer*	122
Editorials		132
Reviews		136
Research Abstracts and Bibliographies		144
News and Communications		150

THE JOURNAL OF EDUCATIONAL RESEARCH is indexed in the Education Index

---

Copyright 1929, by Public School Publishing Co.

Entered as second-class matter at the Post Office at Bloomington, Illinois under the act of March 3, 1879

JOURNAL OF EDUCATIONAL RESEARCH

EDITORIAL BOARD

E. J. ASHBAUGH, *Dean, School of Education, Miami University, Oxford, Ohio*

A. S. BARR, *Chairman, University of Wisconsin, Madison, Wisconsin*

V. T. THAYER, *Ethical Culture Schools, 33 Central Park West, New York City*

ASSOCIATE EDITORS

FRED C. AYER, *Professor of Educational Administration, University of Texas*

HARRY J. BAKER, *Clinical Psychologist, Detroit Public Schools*

FOWLER D. BROOKS, *Johns Hopkins University*

B. R. BUCKINGHAM, *Harvard University*

W. W. CHARTERS, *Director of Bureau of Educational Research, Ohio State University*

VIRGIL E. DICKSON, *University of California, Berkeley*

CHARLES FORDYCE, *Director, Bureau of Educational Measurements, University of Nebraska*

WILLIAM S. GRAY, *Dean, School of Education, University of Chicago*

M. E. HAGGERTY, *Dean, College of Education, University of Minnesota*

V. A. C. HENMON, *Professor of Psychology, University of Wisconsin*

KARL J. HOLZINGER, *School of Education, University of Chicago*

ERNEST HORN, *College of Education, University of Iowa*

EARL HUDELSON, *Professor of Education, University of Minnesota*

ARTHUR W. KALLOM, *First Assistant Director, Department of Educational Investigation and Measurement, Public Schools, Boston*

F. J. KELLY, *President, University of Idaho*

WILLIAM A. McCALL, *Associate Professor of Education, Teachers College, Columbia University*

EUGENE NIFENECKER, *Assistant Director, Bureau of Reference, Research and Statistics, Public Schools, New York City*

W. J. OSBURN, *College of Education, Ohio State University*

SHELTON PHELPS, *Director of Instruction, George Peabody College for Teachers*

J. B. SEARS, *Stanford University, California*

J. L. STENQUIST, *Director, Bureau of Educational Research, Public Schools, Baltimore, Maryland*

GEORGE D. STRAYER, *Teachers College, Columbia University*

W. W. THEISEN, *Assistant Superintendent of Schools, Milwaukee, Wisconsin*

M. R. TRABUE, *Director of the Bureau of Educational Research, University of North Carolina*

W. L. UHL, *Dean, College of Education, University of Washington*

C. W. WASHBURNE, *Superintendent of Schools, Winnetka, Illinois*

GUY M. WHIPPLE, *Secretary, National Society for the Study of Education*

CLIFFORD WOODY, *Director, Bureau of Tests and Measurements, University of Michigan*

THE JOURNAL OF EDUCATIONAL RESEARCH is published at Bloomington, Illinois, monthly, except July and August by the Public School Publishing Company. The subscription price is $4.00; $4.20 in Canada or Mexico; and $4.50 in other foreign countries.

Subscriptions and all communications about reprints or other business matters should be addressed to the PUBLIC SCHOOL PUBLISHING COMPANY, at Bloomington, Illinois.

Address all communications on editorial matters to A. S. Barr, Department of Education, University of Wisconsin, Madison, Wisconsin.

JOURNAL *of* EDUCATIONAL RESEARCH

Volume XX SEPTEMBER 1929 Number 2

A STUDY OF JUVENILE THEFT

HARRY J. BAKER
Clinical Psychologist

and

FRED J. DECKER
ARTHUR S. HILL
Mental Examiners
Detroit Public Schools

INTRODUCTION

THE purpose of this investigation was to study the factors which contribute to juvenile theft. Investigations in various cities show that theft comprises from thirty-three percent to seventy-five percent of the delinquency among boys. In Detroit theft comprises fully one-half of the total delinquencies and, therefore, merits study and investigation.

CONDITIONS OF THE INVESTIGATION

The experimental group and the control group each contained eighty-four boys. The experimental cases had been formally convicted of theft by the Juvenile Court of Wayne County, Detroit, and through that organization the confidential records were made available for this study. The control group was selected by the schools, and the cases were matched with the experimental group as to age, grade, nationality and neighborhood.

The matching of ages was limited to differences of six months or less and the ages in both groups ranged from ten to sixteen years. The median age was approximately thirteen years. Grade matching was limited to a difference of one-half a grade with a range from the third to the eleventh grade. The median was in the upper sixth grade. In each group six boys were also included from the special, subnormal classes.

There was an exact matching with respect to the country of birth of the fathers of these boys. In each group sixteen were American white, ten American colored, twenty Polish, eleven Italian, and the balance scattered among ten other European countries. An attempt was further

made to match the experimental and control group with respect to the neighborhood from which they came by taking one boy of each group from the same school. While there is a general homogeneity of neighborhood status near any particular school, some marked discrepancies probably have occurred in matching, particularly since good residence districts sometimes border on industrial zones with railroad tracks. It should be added that these cases did not all come from one section of the city nor from pupils of one social class.

COMPARISON OF THE GROUPS

Comparative data were gathered for each group of eighty-four boys on the following points: 1) family status; 2) school status; 3) physical and mental status; 4) and personal and social traits. Data on each of these points will now be presented with comments as to differences or similarities.

FAMILY STATUS

There was a slight but probably insignificant difference in family income in favor of the control group. The median weekly income of the experimental group was $37.50, whereas in the control group the amount was $38.00. Ownership of homes or paying for homes was found in fifty-seven percent of the cases of the experimental group, and in sixty-two percent of the cases of the control group. This difference was relatively small but is in favor of the control group. The median monthly rental for those who do not own their own homes was $32.50 for the experimental group and $39.16 for the control group. This difference of almost seven dollars per month probably represents a real difference in the home status. These findings were confirmed further by the fact that thirteen of the experimental homes were poor in appearance, while only two homes of the control group were rated as poor. The general furnishings of the homes were poor in seventeen of the experimental group as compared to six of the control group.

Differences in the size of family were insignificant with a median size of 6.5 persons for the experimental group and 6.4 persons per family for the control group. Likewise the number of rooms in the home was insignificant with 5.1 rooms per home in the experimental group and 5.4 in the control group. Since the experimental group family was slightly larger than the control group and the number of rooms slightly smaller, the cumulative effect of the two factors may be of some significance.

There is a difference of eight percent in the number of broken homes in favor of the control group, which is probably significant. In nineteen percent of the control group broken homes occur, as compared with twenty-seven percent in the experimental group. This difference appears even more important when homes are included which are not actually broken but in which there is lack of adequate supervision, such as occurs when both parents work for long hours. Twenty-four percent of the control group were found in this category, whereas forty-four percent in the experimental group were thus found.

The age of parents at birth of their children seems to show no striking difference in favor of either group. In the control group the average age of fathers was approximately twenty-seven years and of mothers approximately twenty-five years. There was evidence that several fathers were much older in the experimental group than in the control group, which suggests a lack of ability to adjust themselves to the level of the child's understanding and sympathy.

Ten out of every twelve parents of children in the experimental group had an eighth grade education or less, while only eight fathers and nine mothers out of every twelve in the control group had the same minimum of education. The difference in this aspect of environment seems slight, but the cumulative effect of slight differences in many factors is worthy of careful consideration.

The occupations of fathers showed no significant trend in favor of either group; all types and kinds of occupations were represented in both groups.

It is frequently assumed that a short time of residence in this country with subsequent lack of knowledge of customs and ideals tend to produce instability and delinquency. Our data are inconclusive since the average length of residence of fathers in America is 15.0 years for the experimental group and 16.9 years for the control group.

The parents of these two groups of children were rated in a large number of good and poor character traits. In the control group eighty citations were made of good character traits as compared with fifty-seven in the experimental group. Six citations were made of poor character traits among the parents of the control group, whereas twenty were made in the experimental group. These results seem to show that the mental and social environment of the two groups differed more from one another than did the physical conditions and furnishings of the homes.

SCHOOL STATUS

The grade placement of each pupil in the experimental group was matched with the control group, to within one-half grade. The amount of time spent in school as measured from a common basis of entering school at age six, shows that both groups had attended school ninety per-cent of the time. In the number of semesters in each grade there was a slight difference in that the experimental group had spent one semester per half-grade whereas the control group had spent ninety-six percent of a semester per half-grade.

The school histories of these pupils showed that the median number of different schools attended by the experimental group was 3.4, whereas the median for the control group was 3.7. There are no marked differences in scholarship records. The experimental group was slightly inferior to the control group in social science, which is closely related to general social attitudes. In attitudes toward school the differences were of much more importance. The experimental group had twenty-one members who were enthusiastic about school as compared with forty of the control group. Sixty-two members of the control group showed a coöperative attitude toward school as compared with forty-nine of the experimental group. Thirty-nine members of the experimental group disliked school or were truant as compared with seven for the control group.

PHYSICAL AND MENTAL STATUS

Differences in general intelligence were somewhat more pronounced than were the differences in other traits mentioned above. In intelligence the experimental group was noticeably poorer than the control group, as per the following table:

	Inferior	Average	Superior
Experimental	55.5%	40.3%	4.2%
Control	47.8%	43.5%	8.7%

Approximately twice as many pupils of the control group were rated superior as in the experimental group. There is a corresponding difference of several percent in the inferior group, in favor of the control group. These differences, however, are probably not great enough to assume that intelligence was the principal differentiating factor between groups.

There were no significant differences in the number of children's diseases suffered by the two groups. The average number of diseases per pupil in the experimental group was 1.23, whereas in the control

group it was 1.58 diseases per pupil. It is difficult to place any meaningful interpretation upon the differences which exist. A very sickly child is more liable to be spoiled and indulged than a healthy child, but with our groups the opposite condition appeared to be the case.

In the experimental group six head injuries were reported, and in the control group three were found. The total number of injuries to all parts of the body was 12 for the experimental group and for the control group was 13. Apparently this difference is of no importance.

In the case of physical and sensory defects there was a slight difference in favor of the control group. The average number of uncorrected physical defects for the experimental group was 1.73 as compared to 1.38 for the control group. These defects may impair the general health, or hinder the proper functioning of the sensory organs so that pupils are not interested in school and hence look for other outlets for their activities. These differences in the number of uncorrected physical defects reflected a poor attitude of parental care.

SOCIAL AND PERSONAL TRAITS

Sixty-seven of the eighty-four boys in the control group were native born as compared to sixty-one of the experimental group. In some cases change of country with new language, customs and ideals had undoubtedly disturbed the social and mental equilibrium. While the difference in birthplace is in favor of the control group, the length of residence in the United States of the foreign born favors the experimental with a median of 11.5 years as compared to 7.5 years for the control group.

In the use of leisure time the experimental group showed themselves considerably inferior to the control group. At first sight the data may seem contradictory for in the summer months the experimental group spends a median of 13.5 hours per week on the playgrounds as compared to a median of 9.8 hours for the control group, and in the winter months the experimental group spends a median of 6.4 hours per week in this manner as compared to 7.1 hours for the control group. First-hand experience with the playgrounds show that the activities are quite well organized and directed in the winter months, but during the summer in spite of attempts at regulation, playgrounds often become the rendezvous of lawless gangs of lazy boys who do not try to find work. Under such circumstances the time on playgrounds was considerably in favor of the control group.

Thirty-seven experimental boys and twenty-seven control boys participated in organized athletics, which would seem to favor the experimental group. The experimental group, however, indulged chiefly in a rough-and-tumble type of football without adequate leadership which probably offset any advantage in their favor by virtue of number of activities alone.

Ten experimental boys and two control boys attend the movies an excessive number of times per month, but aside from these extreme groups the median times in attendance at movies per month are approximately equal. There is a marked difference, however, in that the experimental group prefer the Western cowboy type of movie much more frequently than the control group.

The same tendency is to be found in the similar type of hero in their reading of books and magazines. Cheap fiction of the "blood-and-thunder" type leads the list for the experimental group. There is no significant difference in the number of books read per month with medians of 3.8 and 4.1 respectively, for experimental and control groups.

All except two of the control group and all but eleven of the experimental group claim affiliation or membership in some church or religious organization. In both groups there is a preponderance of Roman Catholics, chiefly on account of the nationalities and neighborhoods selected for the study. The median number of times attending church per month is 3.13 and 3.29 respectively, for the experimental and control groups. Five boys in each group hold offices in Sunday school.

There is a slight advantage in favor of the control group in the amount of employment, with a median of 9.7 hours per week as compared to 8.8 hours for the experimental group. The number of boys working from each group comprises about twenty-five percent of the total. The average wage in cents per hour is approximately equal in both groups.

In the matter of character traits there is a distinct difference in favor of the control group. The subjects were rated by their teachers in forty-five traits, divided approximately equal between the desirable and undesirable ones. The experimental group received forty-four percent of desirable ratings and fifty-six percent undesirable, while the control group received seventy-eight percent desirable and twenty-two percent undesirable ratings. The proportion of times that traits were mentioned, between the experimental and the control groups, shows that sneaking was in the ratio of 9 to 1, laziness 7 to 1, restlessness 7 to 3, etc.

Although teachers were not aware that theft was the basis of selection, 31 of 84 experimental cases but none of the control group, were reported by teachers for stealing. Fifty experimental cases and fourteen control cases were reported for fighting, twenty experimental cases and five control cases had complaints of sex offenses, ten experimental cases and one control case were truant from home, and forty-one experimental cases and six control cases were truant from school. In these latter offenses more marked differences were found to exist than in all the other traits together.

SUMMARY

A technique has been described which compares eighty-four boys convicted of juvenile theft with an equal number of boys who served as a control group. The groups were matched as to age, grade, nationality and neighborhood status. The results are summarized under three captions as follows:

(1) The factors showing no significant differences were economic status, father's occupation, size of family, position of boy among siblings, roomers or boarders in the home, church attendance, health or injury, time in school, change of schools, school marks, work and earning power of boys, and attendance at movies.

(2) Factors showing considerable differences in favor of the control group were conventional ages of parents at the birth of their children, unbroken homes, lack of crowding in homes, general intelligence, supervision of play, correction of physical defects, suitable playmates, and church affiliation.

(3) Factors showing quite marked differences in favor of the control group were good character traits in parents and children, physical condition of homes, supervision by parents not both employed, and school attitudes.

THE RELATION OF THE HOME FACTOR TO ACHIEVEMENT AND INTELLIGENCE TEST SCORES

MARLIN R. CHAUNCEY
Oklahoma Agricultural and Mechanical College

THE recently developed Sims Score Card for Measuring the Socio-Economic Status offers a new opportunity to study the relation of the "home factor" to such other factors as the achievement and intelligence of school children.

Through the coöperation of Superintendent Chester P. Davis, of the Stillwater, Oklahoma, city schools, the writer secured a body of data which reveal the significance of the rating of the home, as measured by the Sims Score Card, in relation to school achievement, as measured by the Stanford Achievement Test. The data further reveal the relation between the home factor and mental level, as measured by the McCall Multimental Scale. The chronological ages of the pupils were determined and this factor is also reported.

The groups studied were an eighth grade group of 113 pupils and a ninth grade group of 130 pupils. The pupils attended the Junior High School, Stillwater, Oklahoma. The two groups were similar, so far as known, with one exception. The ninth grade is the transfer point for rural pupils who wish to complete high school and therefore it is probably true that there is a tendency for the duller children to drop out at this point since there is no compulsory feature beyond the eighth grade. Promotions in the rural schools tend to be slower than in the city. This may result in the inclusion of a number of older and brighter pupils in the ninth grade.

The accompanying tables carry fairly complete statistical values for the two groups. Readers who wish to make more interpretations than are attempted in the present discussion, will find the complete tables of service. Table I carries the mean scores, the standard deviations, and the number of the pupils tested. It is particularly important to note the results for the Sims Score Card. The average score reported by the author is 16. The means for our two groups are just slightly higher. It is clear from the size of the standard deviations that the two groups range both above and below Sim's average. In other words, these two groups constitute a fair cross-section of American homes, not an atypical sample. The wide range of "home status", represented in the study, gives abundant opportunity for these differences to operate in their relation to school success, mental level, and rate of progress through school.

TABLE I

SUMMARY OF RESULTS ON THE FOUR MEASURES

	Stanford Achievement Test	Multimental Scale	Chronological Age	Sims Score Card
8th Gr.	$M_1 = 66.78$	$M_2 = 275.0$	$M_3 = 13.34$	$M_4 = 18.62$
9th Gr.	$M_1 = 69.83$	$M_2 = 302.1$	$M_3 = 14.60$	$M_4 = 18.17$
8th Gr.	$\sigma_1 = 12.28$	$\sigma_2 = 82.5$	$\sigma_3 = 1.16$	$\sigma_4 = 5.94$
9th Gr.	$\sigma_1 = 11.04$	$\sigma_2 = 77.7$	$\sigma_3 = 1.17$	$\sigma_4 = 5.74$
8th Gr.	$N_1 = 113$	$N_2 = 113$	$N_3 = 113$	$N_4 = 113$
9th Gr.	$N_1 = 130$	$N_2 = 130$	$N_3 = 130$	$N_4 = 130$

TABLE II

SUMMARY OF ZERO ORDER, FIRST ORDER, AND SECOND ORDER COEFFICIENTS OF CORRELATION FOR THE FOUR MEASURES

8th Grade N 113						9th Grade N 130					
Zero Order		1st Order		2nd Order		Zero Order		1st Order		2nd Order	
Index	Value	Index	Value	Index	Value	Index	Value	Index	Value	Index	Value
12	.571	12.3	.499	12.34	.493	12	.593	12.3	.553	12.34	.541
12	.571	12.4	.545	12.34	.493	12	.593	12.4	.572	12.34	.541
13	−.496	13.2	−.400	13.24	−.350	13	−.416	13.2	−.339	13.24	−.297
13	−.496	13.4	−.430	13.24	−.350	13	−.416	13.4	−.364	13.24	−.297
14	.300	14.2	.227	14.23	.098	14	.353	14.2	.303	14.23	.265
14	.300	14.3	.129	14.23	.098	14	.353	14.3	.286	14.23	.265
23	−.324	23.1	−.057	23.14	−.047	23	−.257	23.1	−.014	23.14	−.017
23	−.324	23.4	−.270	23.14	−.047	23	−.257	23.4	−.221	23.14	−.017
24	.206	24.1	.044	24.13	.028	24	.191	24.1	.024	24.13	−.026
24	.206	24.3	.089	24.13	.028	24	.191	24.3	.137	24.13	−.026
34	−.397	34.1	−.300	34.12	−.298	34	−.243	34.1	−.113	34.12	−.113
34	−.397	34.2	−.297	34.12	−.298	34	−.243	34.2	−.204	34.12	−.113
Coefficients of more than .24 are four times P.E. or more.						Coefficients of more than .225 are four times P.E. or more.					

In the index column above the numeral "1" is used to signify the Stanford Achievement Test; "2" for the McCall Multimental Scale; "3" for Chronological Age; "4" for Sims Score Card.

In interpreting the data carried in Table II, we may begin profitably with the zero order coefficients for the Stanford Achievement and the Multimental scores (r_{12}). The values are .571 and .593 for the two grade groups respectively. These values agree favorably with results usually found for such factors. The relative independence of the association of these two factors is evidenced by the small reduction in the value when the two secondary factors are held constant. The resulting values are ($r_{12.34}$) .493 and .541, respectively.

Next, we will note the association of the "home factor" with the three other factors. For the Sims scores and the Stanford Achievement scores, the zero order coefficients (r_{14}) are .300 and .353 for the two groups. While the intensity of the relationship is markedly lower than for intelligence level and achievement, the values reveal a significant relationship. When the secondary factor of intelligence is held constant ($r_{14.2}$), the values become .227 and .303. The former value has been reduced

slightly below 4 times its P. E., while the latter remains a significant value. Since considerations of common sense suggest that the home factor plays the rôle of a causal factor which tends to raise the level of achievement, rather than *vice versa*, we may conclude with considerable safety, that home status, as measured by the Sim's Score Card, makes a significant contribution to school achievement.

The zero order values for the Sims Score and the Multimental Scores (r_{24}) are .206 and .191. The values are too low to be significant in both groups. We may conclude that home status, as measured by the Sims Score Card, plays a less important part in determining mental level than in determining school achievement.

The final relationship, which is pertinent to our purposes, is that of the Sims Scores to the chronological age. We may fairly consider the age at which a given pupil arrives at a given grade as a rough, additional measure of school achievement. The younger pupil has attained relatively more "success" than has the older pupil of the grade. The zero order values for the two factors (r_{34}) are $-.397$ and $-.243$. The values are significant in both groups. Since home status, rather than age, appears to function as the causal factor we may conclude that inferior homes tend to retard, and superior homes tend to accelerate, the progress of children through the schools.

Two suggestions of considerable practical value emerge from a study of the above data and conclusions. First, progressive parents will find objective evidence justifying current efforts to create optimum conditions in the home, looking toward the greater success of their children in the work of the school. Second, educators will find grounds for both encouragement and caution. The value of the association for home status and school achievement, while significant, is relatively low. It is apparent, first, that while a certain pupil has rated low in home status, his school achievement may have been satisfactory. Evidently, the school facilities have partially made up the deficiency. This is the educator's opportunity. It is further apparent that while a certain pupil has rated high in home status, his achievement may have been mediocre or low. In this case the educator has failed, in a measure, to harness the possibilities for training which are implied in the good home situation. This suggests the educator's need of caution.

THE RELIABILITY AND VALIDITY OF FOUR TYPES OF VOCABULARY TESTS

VERNER MARTIN SIMS
University of Alabama

NUMEROUS methods for testing vocabulary have been suggested during the past few years, but no attempt to determine objectively the best means for securing a measure of vocabulary seems to have been made. Several authors report the reliability and validity of their own tests, but the conditions under which these data are determined vary so much from test to test that they do not justify the drawing of conclusions concerning the best type of test. Dolch[1] has made a very satisfactory analysis of the more common types of tests used, and he presents a good discussion of the merits and demerits of each type; but the major portion of this discussion is based upon personal opinion, or psychological analysis rather than experimentation.

It is the purpose of this paper to report the results of an investigation of the relative reliability and validity of the four types of tests most commonly used for measuring vocabulary.

Most of the suggested methods for testing vocabulary and all of the published tests that the writer knows of may be classified under one of the following types: (1) Identification tests, where the words are presented orally, visually, or by both methods to the individual subject and the subject asked to respond by orally identifying the word through definition, use, synonym, illustration or otherwise. Terman's Word List, used in connection with the Stanford Revision of the Binet-Simon Tests is the classical example of this type. (2) Multiple-response tests, where along with the test word are presented three, four, or more words or phrases, one of which is the correct definition of the word. The subject identifies the correct definition usually by drawing a line under it. Two of the most commonly used tests, the Thorndike Test of Word Knowledge and the Inglis Test of English Vocabulary, well illustrate this type. (3) Matching tests, where the test words are presented in columns and along with these words the definitions are presented in a parallel column, but arranged in different order; the subject being required to arrange the definitions in the same order as the test words. The Detroit Word Recognition Test and the Southington-Plymouth English Vocabulary

[1] Dolch, E. A. *Reading and Word Meaning.* Ginn and Company, 1927.

Test are typical examples of this type. (4) Checking tests, where the subjects are presented with a printed list of words and asked to check those words they can define, use, illustrate, etc. The checking may or may not be followed by requiring the subject to write the definition of certain selected words. Whipple Range of Information Test and Starch's English Vocabulary Test are examples of this type.

It is with the reliability and validity of these four types that we are here concerned. The general procedure used to evaluate them was to test the same group of subjects on the same list of words by each of the four methods, and from these data to determine the reliability by correlating chance halves and to show evidence of validity by inter-correlations.

The subjects used were 110 school children ranging from grades 5 to 8. The words used were seventy words having but one commonly used meaning, selected from Form B of the Thorndike Test of Word Knowledge.[2] For the multiple-response test the Thorndike test was given, but only the selected words were scored. The matching test was prepared by grouping the seventy words in sets of ten and using the correct response from the Thorndike test as a basis for the definition. The identification test was given by furnishing the subjects individually with a mimeographed sheet containing the seventy words in two columns and calling the words one at a time and writing the oral response. The checking test consisted of mimeographed sheets containing the seventy test words and seventy other words selected at random from the Thorndike *Word Book*. The subject indicated knowledge of the word by checking as shown in the directions given below.

The checking test was given first. The directions used were those reported by Dolch[3] as being the most satisfactory; and are as follows: "I want you to help me in testing out these words to find which are the hard ones on the list. Since I am not testing you but the words, there is no point to your claiming to know a word if you do not know the meaning. Please mark with a cross (X) those words the meaning of which you would be sure to know if you met the words in reading, mark with a zero (0) those of which you would certainly not know the meaning, and mark with a question mark (?) those about the meaning of

[2] Dolch has wisely called attention to the fact that words with more than one meaning are best left out of tests unless provision is made for testing the various meanings the words may have.

[3] *Op. cit.* p. 44.

which you would be doubtful. Remember, we are trying to find the hard words. A cross if certainly known, a zero if not known, and a question mark if doubtful." When all the students in a classroom had finished the checking test the Thorndike test was immediately given, and Thorndike's directions were used. Three weeks later the matching test was given. The test was preceded with a practice set in order that all the subjects would be sure to understand the directions which were: "This is a matching test. Each word, sentence or phrase in the second column is to be matched with the word in the first column which has the same or nearly the same meaning. The matching is done by writing in the blank space in front of each word, phrase or sentence in the second column the number of that word in the first column that means the same or nearly the same." Approximately six weeks later the identification test was given. The children were taken individually into a separate room and were not allowed to return to the classroom until all members of the room had been tested.

The attempt was made to plan the tests, the order of giving, the conditions under which they were given, and the instructions in such a manner that the "practice effect" would be reduced to a minimum. The checking test contained seventy extra words; the multiple-response contained thirty extra words. The checking and the multiple-response were given on the same day, since there can be no practice effect following the checking test. Time intervals between other tests seemed necessary if correlation between the tests were to mean anything other than a good memory. The children were not aware of the fact that they were to be retested, thinking instead that each test was the last. In fact, questioning of the children from time to time lead to the belief that many of them were not conscious of the fact that they were being re-tested with the same words. The teachers were requested to make no mention of the tests during the time that elapsed between them. They were asked to answer no questions, to make no specific mention of particular words used in the testing and to attempt to divert the minds of the children as soon as possible after the testing. There is every reason to believe that they coöperated, since they were all aware of the nature of the experiment. In spite of these cautions, there was in all probability some practice effect involved in such a series of re-testing with the same words. Because of this re-testing, average scores cannot be taken very seriously, but the practice effect would have slight effect on our results, since the

primary interest is in the change of the relative position within the group rather than in total scores made.)

The writer gave all of the multiple-response, the matching and the checking tests. With the identification tests, three assistants who had been previously trained were used in the giving but all answers were scored by the writer.

Two of the tests used are scored objectively, the score being either right or wrong. For the identification test, Terman's technique of scoring was used and great leniency was shown in grading, any knowledge of the word being scored correct. The score on the checking test consisted of those test words marked as surely known.

The average score and standard deviation for each test is shown in Table I. It is noticed that the average is very nearly the same for each test, but that the checking test has a decidedly greater range than the other tests.

TABLE I

SHOWING THE AVERAGE AND S.D. FOR FOUR TESTS

	Average	S.D.
Identification test	26.9	9.0
Multiple-Response test	28.0	9.8
Matching test	28.9	11.4
Checking test	28.1	15.0

The coefficient of reliability was determined by correlating the scores on chance halves (odds and evens) of each test, and then stepping up this coefficient by means of Brown's formula. The reliability coefficient thus determined for each test with the probable error of the raw score[4] is shown in Table II.

TABLE II

SHOWING THE RELIABILITY OF THE TESTS

	Coefficient of reliability	P.E. of the raw score
Identification test	.92	1.7
Multiple-Response test	.84	2.6
Matching test	.93	2.2
Checking test	.92	2.8

The evidence here seems to indicate that all the tests have a high degree of reliability. The multiple-response test shows a lower coefficient but, because of the narrow range, the probable error of a raw score is less than that of the checking test. The reliability of the multiple-response would probably be slightly improved if it were corrected for guessing.

[4] Ruch and Stoddard. *Tests and Measurements in High School Instruction.* p. 367. Formula used: $P.E._{raw\ score} = .6745\ \sigma_1 \sqrt{1-r_{12}}$

Tests cannot be considered satisfactory, however, simply because they are reliable. In addition, there must be evidence of validity, that is, evidence that they measure what they claim to measure. The method of determining validity which is usually considered most satisfactory is to set up some external criterion and compare each test with it. This method did not seem practical in the case of vocabulary tests, consequently we have resorted to the method of inter-correlations. Since the four tests claim to measure the same thing, there should be close agreement among them. Table III presents the correlation between the scores for each test with every other test, and the correlation between the scores for each test and the average scores for the other tests. Inspection of this table seems to indicate that the matching test, multiple-response test and identification test are measuring approximately the same thing, but the checking test does not tend to agree closely with any of the other forms or with the average of the three forms.

The size of the correlations take on an added significance when we consider that the four tests are dealing with exactly the same words.

TABLE III

SHOWING THE INTER-CORRELATION BETWEEN THE FOUR TYPES OF TESTS

	Checking	Multiple-Res.	Matching	Identification	Aver. Scores Other Three Tests
Identification	.56	.74	.82	.92	.90
Matching	.64	.85	.93	.82	.83
Multiple-Res.	.54	.84	.85	.74	.76
Checking	.92	.54	.64	.56	.66

They should also be interpreted in terms of the size of the reliability coefficient. We know that the limit of correlation that is possible between two tests is determined by the square root of the product of their reliability coefficients ($\sqrt{}_{\text{possible}} = \sqrt{r_{12} - r_{I\,II}}$).[5] For example, the correlation between the identification and the multiple-response test is seen to be .74, while the total possible correlation that could be found is .88 ($\sqrt{.92 \cdot .84}$). On the other hand, the correlations between the checking test and the identification test is seen to be .56, while the total possible correlation that could be found in this case is .92 ($\sqrt{.92 \cdot .92}$). The time order used in the giving of the tests is obviously not a serious factor in determining the inter-correlation since the lowest correlation found is between the checking test and the multiple-response test, yet these two tests were given within the same hour. The low inter-correlations for

[5] For proof, see Kelley, *Statistical Method*. 1923, pp. 205-208.

the checking test are therefore a serious condemnation of this type test.

Probably all competent judges will agree that the identification test is the most valid test of vocabulary. Although one must recognize certain psychological differences between the mental processes involved in this type which is purely recall, and the matching and multiple-choice tests which involve recognition, the correlation between the processes is certainly high. The fact that the checking test is presumably a test of recall also should cause it, if it were a valid measure of vocabulary, to give a higher correlation with the identification test than either of the other two. We see from Table III that this is far from true.

The facts brought out in this investigation may be summarized as follows: First, the reliability coefficients for the four types of tests are approximately equal and rather high. Secondly, the inter-correlation among the tests is high for the identification, multiple-response and matching tests, but the checking test does not show very satisfactory correlation with any of the other tests. Thirdly, there is some evidence that the matching test gives the most satisfactory group measure of vocabulary.

To assume that the checking test measures vocabulary is, in the opinion of the writer, a very doubtful assumption. It consistently measures something, and probably this something is familiarity with the word because of having frequently seen and heard it. Dolch found some agreement between words checked as known and frequency of occurrence in general reading as reported by Thorndike and Horn,[6] but he mistakes this agreement for satisfactory evidence of validity. The child is very apt to think that he knows the meaning of words that he has frequently met in his reading and he is sure that he does not know words that he has never seen before. The definite, if low, correlation which we have shown to exist between the checking test and other tests indicates that there is some relation between thinking that one knows the meaning of a word and actually knowing the meaning, but the size of the correlation indicates that the agreement is not enough to justify the conclusion that checking lists is a satisfactory method of determining vocabulary. The writer is inclined to believe that a good guess as to whether or not a child knows the meaning of a word is almost as satisfactory a method of determining vocabulary as checking tests. The relative simplicity of such a measure, the ease of preparation and administration, should not blind one to its invalidity. Vocabulary studies based upon this measure are of very doubtful value.

[6] *Op. cit.* p. 46-56.

A SURVEY OF STUDIES IN EXPERIMENTAL AESTHETICS

R. Alice Drought
University of Wisconsin

The field of experimental aesthetics is practically virgin. Philosophy long ago laid claim to art, treating art from the speculative viewpoint and considering—abstractly—the relation of art to our social order. Accordingly, we hear of philosophies of art usually quite apart from philosophies of life. Art for art's sake has become almost a platitude, but the mere mention of art for life's sake still occasions in many individuals the sardonic personification of the idea that while such a thing might be a Utopian possibility, it nevertheless is not within the pale of reality.

Related to the philosophical viewpoint is the historical, which treats of the transitional development of art, considers the art of each period a unit unto itself, and attempts to trace the corresponding periods in our social order.

Of the three approaches to the study of art—the philosophical or speculative (with its corollary, the historical), the aesthetical, which regards art as an aesthetic experience, and, the psychological, interested in art as a creative experience and as a definite something to which the individual reacts, the last has received the least attention.

In the psychological studies of art at the University of Wisconsin, an experimental investigation is being made to determine how generally the appreciation of that which we call beautiful, is distributed in the average run of individuals; and to determine the sensitivity of the individual to the fundamental variables out of which beauty—in any and all art—is created. This looks forward to the establishment of a standardized test for art appreciation. The studies are divided, roughly, into two groups: those dealing with the adult, and those dealing with the child. Both of these studies are concerned with reactions to fundamental art principles.

As a working hypothesis, Hegel's definition of art as "the free and adequate embodiment of an idea, in a manner peculiarly adapted to the idea itself" was accepted. From this definition of art, various fundamental elements or principles of art were formulated to include unity, harmony, and proportion. A fourth element (which is outside the realm of principles) is that of fitness or congruity. These fundamentals were accepted in preference to the usual fundamentals enunciated (namely,

harmony, sequence, and balance) because they seemed more inclusive while being mutually exclusive. There is less overlapping than in the case of the terms harmony, sequence, and balance, where sequence is a very definite part of harmony.

Harmony has to do with motion, arrangement and composition. It is a fitting together peaceably of the elements of a composition. It concerns itself with everything which causes the eye, in logical sequential motion, to attain the goal upon which it rests. Harmony is secured by the repetition of a selected unit; by the repetition of the dominant idea; and by the sequential arrangement of forms in design.

The idea of intricacy in a design or a composition as a stimulant of thought action, is related to harmony in that it, too, has to do with motion, the motion of the eye. It is that element in design which stimulates the curiosity of the beholder, or which stimulates thought activity in a related field. It may serve to enrich the central idea.

Proportion is a space relationship of areas. It is the correlation of size, of areas, lengths, or volumes. Proportion is achieved theoretically through a feeling for mathematical law. For practical purposes, however, a sense of balance, either symmetrical or occult, is taken as a test of proportion. While balance is an equality of visual stimuli, proportion is an equality of stimulus differences.

The idea of congruity, before-mentioned, is but a corollary of Hegel's idea of freedom and adequacy, of the treatment of an idea in a manner peculiarly adapted to the idea itself. It is a limiting factor of freedom of expression in accordance with the demands of good taste and trained intellect.

With these basic principles in mind, several series of sketches were prepared, illustrating the principles of art by specific violations of them. In order to put the studies on as scientific a basis as possible, to make them as valid as possible, the sketches used in the experiments were prepared by experts. One set of drawings—of an American skyscraper—was prepared by the architect Harvey Wiley Corbett, of New York City, and rendered by Hugh Ferris; another set, treating the Bush Building in London, was done by Harvey Wolcott, a student of Mr. Corbett. A third sketch, based on a pastoral scene of Millet's, was made by Howard Giles of New York City and the Boston Museum of Fine Arts. Still other sets of pictures were drawn by Mark Seelen, one of the leading poster artists of Chicago; and three additional sets, treating of Greek vases

and design, were sketched by art instructors of the University of Wisconsin.

Thus a test battery of nine sets of pictures, five to a set, was secured. Each set or series of pictures dealt with one specific subject. The test pictures embody a comparison of variables, the variable factors entering in a definite succession of presentation. One picture of each set embodied all of the principles of art, and for purposes of this study was termed the perfect picture. This picture incorporated the idea or ideal of "value," that is, the essence of a unified, harmonious, dynamic, equilibrated organization of wholes in temporal or spatial patterns. Each of the other four pictures was a variation of the same theme. In the pictures violating unity, two centers of interest were created. Violations of the element of harmony were secured by omission of any suggestion of rhythm, or suggestion of relatedness of parts, other than a feeling of oneness and spatial relationships. Violations of the principle of proportion were secured by lack of balance in the composition. Elements of incongruity—superfluous features or features unsuited to the general character of the composition, were introduced to express a violation of the idea of fitness.

The method of presentation by paired comparisons was adopted after experiment had proved its greater effectiveness over other methods. Governing the tests has been the theory that one would respond negatively or positively to a picture in proportion as he is sensitive or not to the fundamental variables, if these variables are fundamental to good art.

In the study of adults the reactions of 160 people, chosen at random, were secured. The group represented people with and without training in art; creative artists and professional men; college professors and college students; greenhouse keepers and business men. The sampling taken was wide enough to be valid.

The results secured showed a definite reaction to the fundamental principles of art. (Figure I). There were individual variations, and ranges of choice included all possibilities from choice of the best picture to choice of the incongruous picture. It was found, however, that the group of people studied placed a perfect picture first in one-half of the cases. As a group, the people responded negatively to an incongruous picture. Response to a picture incorporating an incongruous element seems closely related to one's education and training. Response to a violation of unity was not as marked as response to a violation of harmony and proportion, the latter being placed fourth by the group while violation of harmony was placed third.

It was also found that training in art increases one's sensitivity to fundamental principles, but it does not change the character of the response. By similar character is meant that art trained students place the various violations of fundamental principles in the same order as the average group.

In a study of 275 grammar school children, and 52 high-school students, it has been found that sensitivity to good art increases with general training and education. Children in the lower grades (third to sixth) placed the pictures violating congruity in first place. A very naive group of students in a rural high school likewise placed it first. The effect of art training was most noticeable in the University High School, where reactions to basic principles was very decided, and approximated that of the adult group. The range of placements of the fundamental principles is more restricted with the juvenile group than with adults.

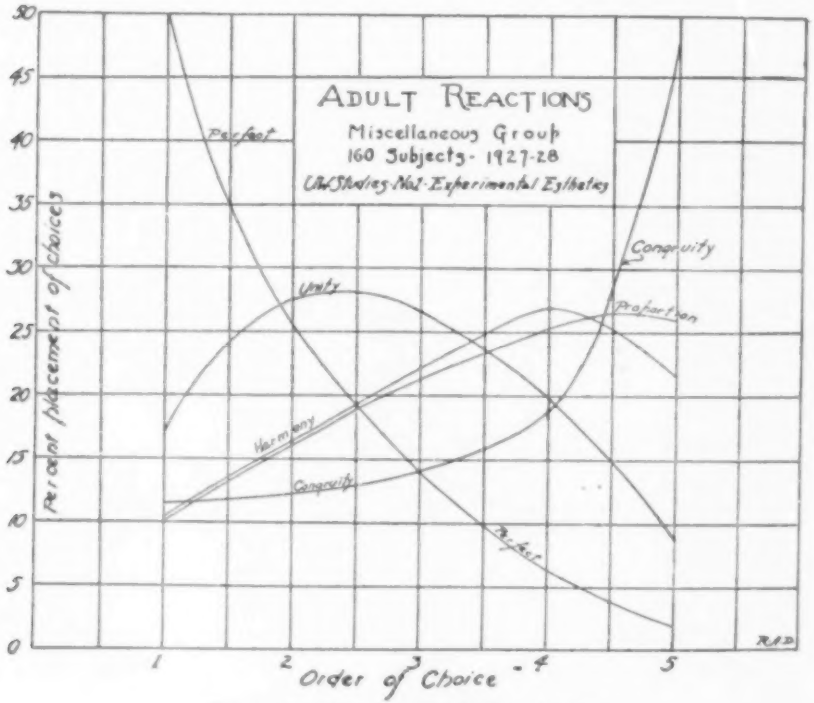


FIGURE I. SENSITIVITY CURVE—ADULTS

Curve showing degree of sensitivity to the various assumed underlying art principles. 160 adult subjects.

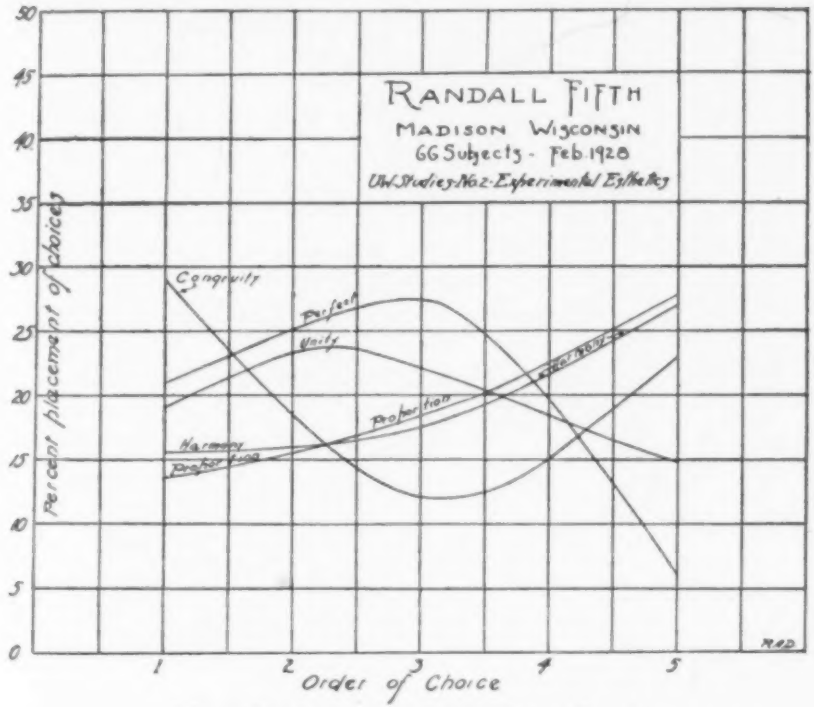


FIGURE II. SENSITIVITY CURVE—FIFTH GRADE

Curve showing degree of sensitivity to the various assumed underlying art principles. 66 subjects, Fifth Grade, A and B sections combined.

With a fifth-grade group, however, the order of choice of the violation of unity is similar to that of the adult group, while the choice of harmony and proportion is interchanged. This may be due to the fact that in the fifth grade there are only 66 subjects represented, while with the adult group there were over twice as many. The greater the number of subjects in any one group, the more decided is the placement of choice.

The results to date seem to point to the conclusion that fundamentally there is little difference as to the placement of choice of violation of: (1) unity; (2) harmony; and (3) proportion or balance. The groups, whether adult or juvenile, seem to be less annoyed by a violation of unity than by a violation of harmony or of proportion. A violation of harmony is more annoying than a violation of unity and less so than a violation of proportion where these are made as nearly equal in degree as possible.

The pictures violating congruity were made as nearly perfect in respect to design as possible. Hence one might expect that an interchange of relative placement of the perfect and the incongruous pictures would depend entirely upon the intellectual capacity and development in detecting the incongruous elements which were, in each instance, incorporated with an otherwise perfect design.

These studies in experimental aesthetics look forward to a science of art. The basic assumptions underlying the study do not in any way imply the existence of formulae for the creative artist. That the principles enunciated are basic is not denied, but it is through feeling rather than intellect that the creative artist uses them. He has a definite feeling of freedom of choice at all times. He may choose a definite correlation of size with any given harmonious or unified composition. If he changes this correlation of size, it automatically implies a change in the harmonious relationship or the unified concept. He is more sensitive to basic principles than is the average individual.

For the beholder these basic principles are of value in that they may serve as a test or as a guide to judgment.

The test battery, which now includes twelve sets of pictures, may be useful as an instrument of analysis for both teaching purposes and testing purposes. It may be used to show completely the factors that are involved in design, and the ways in which they are, or may be, violated.

Used for test purposes, the sets of pictures may measure native sensitiveness and the development of art appreciation at different age levels, the effect of specific training on the appreciation of art, and the evaluation of the importance of different factors in design. They may likewise be indicators of specific aptitudes, for, as a group, musicians have been found to be more sensitive to the matter of harmony than the average run of individuals, while architects, as a group, have been found to be much more sensitive to the matter of proportion.

When it is more generally recognized that art is as much a part of life and of education as science, by so much will the lives of individuals be enriched, and curricula built to fit the needs of individual students rather than to serve the needs of formal education.

THE VOCABULARY OF AMERICAN HISTORY

A. S. Barr and C. W. Gifford
University of Wisconsin

The chief and immediate problem in this study is to get a better understanding of the nature of the vocabulary used in senior high-school textbooks in American history.

In order to get a sampling of the words used in history textbooks, the following textbooks were chosen for analysis:

Beard, C. A. and M. R. *History of the United States,* New York: The Macmillan Company, 1921.

Fish, C. R. *History of America,* New York: American Book Company, 1925.

Fite, E. D. *History of the United States,* Revised Edition. Henry Holt & Co., 1926.

Foreman, S. E. *Advanced American History,* New York: Century Book Company, 1924.

Guitteau, W. B. *History of the United States,* Boston: Houghton Mifflin Company, 1927.

Muzzey, D. S. *American History,* Boston: Ginn and Company, 1925.

Thompson, C. M. *History of the United States,* Rev. Ed., Chicago: B. J. Sandborn and Company, 1922.

West, W. M. *History of the American People,* Rev. Ed., Boston: Allyn and Bacon, 1926.

It was thought on the basis of the data at hand that these textbooks were fairly representative of the larger list of school texts from which they were selected.

The mechanical procedure followed in determining the frequency of occurrence of the words in the eight textbooks[1] was as follows:

1. The first 3,000 most frequently occurring words in the Thorndike Wordbook, were excluded from the study.
2. The remaining words in each of the eight texts were underlined with a red pencil.
3. The underlined words were copied onto 1″ x 3″ strips.
4. The strips for each book were assembled and alphabetized.
5. After the slips had been arranged alphabetically, including all

[1] For a complete statement of the problem, procedure, and finding of this investigation see C. W. Gifford, *The Doctor's Dissertation,* Department of Education, University of Wisconsin, 1928.

the tabulated words for one book, each word was written on a 4" x 6" card. On this card was recorded the frequency of occurrence of each word in each of the eight books.

6. The words from these 4" x 6" cards were then copied onto 8½" x 11" sheets in order to simplify working with them as data. About 50 words appeared on each page.

As stated above, certain words were purposely omitted from the analysis. The several reasons for this elimination and the defense of these reasons would involve too much detail for this abstract. We shall, therefore, include here only a brief statement of the criterion that was used to eliminate unimportant details.

CRITERION USED TO SELECT THE WORDS

1. The first 3,000 words of the Thorndike Wordbook list were excluded.

2. The names of people and places (geographical and political) were excluded.

3. The names of peoples (races, tribes, nationalities, but not creeds) were excluded.

4. Words of a foreign language which were explained in the immediate context were excluded.

5. Words indicating directions such as northeast, etc., were excluded.

6. All connecting adverbs such as whatever, whatsoever, whereas, whereby, thereupon, thereby, notwithstanding, nevertheless, inasmuch, etc. were excluded.

7. All hyphenated words where both parts were found in the first 3,000 of the Thorndike Wordbook were excluded.

8. All chapter summaries, questions for discussion, etc., at the end of each chapter were excluded as were introductions, prefaces, and appendixes.

9. The Declaration of Independence, United States Constitution, Mayflower Compact, and all other full quotations of historical documents were excluded.

10. Almost without exception, the rules for tabulation used by Doctor Thorndike in the compilation of his Wordbook were followed. The rules we used are as follows:

boys, berries	were counted in with boy, berry
badly, sadly	were counted in with bad, sad
longer, bravest	were counted in with long, bra[illegible]

plays, playing, played were counted in with play
thrown, outgrown were counted in with throw
explorer was not counted in with explore
temporary and temporarily were counted separately
go and went were counted separately

RESULTS

In comparing the various textbooks, it is interesting to note the number of words used by each of the eight authors which occur in each thousand of the Thorndike Word list. These data are given in Table I.

TABLE I

NUMBER OF TABULATED WORDS PER TEXT WHICH OCCUR IN EACH THOUSAND OF THE THORNDIKE WORD LIST

Thousands	Fish	Thompson	Guitteau	Foreman	Beard	Fite	Muzzey	West
4	226	249	304	337	316	328	356	305
5	232	251	332	392	353	382	378	353
6	122	155	206	213	213	215	210	239
7	152	206	269	288	295	302	286	327
8	102	113	157	174	175	165	175	185
9	106	126	183	177	209	179	208	213
10	102	116	161	155	165	182	171	176
Below 10,000	1042	1216	1612	1736	1726	1753	1784	1798
Above 10,000	587	923	1275	1340	1389	1396	1368	1608
Words Tabulated	1629	2139	2887	3076	3115	3149	3152	3406

These data must be interpreted in the light of the fact that the Thorndike Wordbook is based upon words selected for their frequency and distribution in general reading material. There were 356 different words in Muzzey, for example, in the fourth thousand of the Thorndike word list; 392 words in Foreman in the fifth thousand, etc. These data are presented in Table II in percentage form.

TABLE II

PERCENT OF TABULATED WORDS PER TEXTBOOK WHICH FALL IN EACH THOUSAND OF THE THORNDIKE WORD LIST

Thousands	Fish	Thompson	Guitteau	Foreman	Beard	Fite	Muzzey	West
4	13.87	11.64	10.53	10.96	10.14	10.42	11.29	8.95
5	14.24	11.73	11.49	12.74	11.33	12.13	11.99	10.36
6	7.49	7.25	7.14	6.92	6.84	6.83	6.66	7.02
7	9.33	9.63	9.32	9.36	9.47	9.59	9.07	9.60
8	6.26	5.28	5.44	5.66	5.62	5.24	5.55	5.43
9	6.51	5.89	6.34	5.75	6.84	5.68	6.60	6.25
10	6.26	5.42	5.58	5.04	5.30	5.78	5.43	5.17
Below 10,000	63.96	56.84	55.84	56.43	55.54	55.67	56.59	52.78
Above 10,000	36.03	43.15	44.16	43.56	44.59	44.33	43.40	47.21

If the words in the fourth and fifth thousands for the several texts are compared, Fish uses the largest percent (28.11 percent) of these more common words. The remaining textbooks use about the same percent (22 percent or 23 percent) of words with the exception of West who uses the fewest (19.81 percent) of the most common words. The same situation also holds true when the textbooks are compared for

words in the 10,000-or-above word group. Fish has the fewest and West the largest number while the remaining texts fall somewhere in between. The authors are not certain as to the significance of these facts. If data were available to indicate that these same words were too difficult for the grades in which these books are used, then one might conclude that Fish's textbook is better suited to these grades than West's which represents the other extreme. If the purpose of the writers of textbooks, however, is to present a richness and newness in word concepts, it is possible that West is superior to Fish in this respect. The data merely say that Fish uses more of the words which occur most frequently in ordinary reading.

If we consider all the books as one average book, we can indicate the percent of different words in the average senior high-school textbook in American history that are located in each thousand of the Thorndike Word list. This is shown in Table III.

TABLE III

NUMBER AND PERCENT OF DIFFERENT TABULATED WORDS OCCURRING IN AN AVERAGE TEXTBOOK FOR EACH THOUSAND OF THE THORNDIKE WORDBOOK

	Thousand	*Percent*	*Number*
	4	10.74	303
	5	11.85	334
	6	6.97	197
	7	9.42	266
	8	5.52	156
	9	6.21	175
	10	5.44	154
Total below	10,000	56.17	1,583
Total above	10,000	43.83	1,236
		100.00	2,819

A study of this table will reveal the fact that there is a difference of only 12.34 percent between the number of words above 10,000 (the infrequently used words) and the number of words between the fourth and tenth thousands of the Thorndike word list. It is hard to read any

TABLE IV

COMPARISON OF TEXTBOOKS ON THE BASIS OF NET TOTAL RUNNING WORDS

Text	Net Total Running Words		Ratio of total running words to the number of different (tabulated) words			
			From 4,000 to 10,000		Above 10,000	
	(Rank)		(Rank)		(Rank)	
Thompson	1	127,600	4	104.93	6	138.24
Fish	2	153,346	8	147.17	8	261.24
Muzzey	3	157,512	1	88.29	1	115.14
Beard	4	175,438	2	101.64	2	126.31
Fite	5	180,123	3	102.75	3	129.02
Foreman	6	183,728	5	105.83	5	137.11
Guitteau	7	195,987	7	121.58	7	153.72
West	8	208,377	6	115.58	4	129.59

significance into these data. No one seems to know just how a textbook should distribute its vocabulary or how its vocabulary should be chosen.

In order to get some indication of the total number of words used by each author per each different tabulated word, the total number of words in each textbook was counted. The ratios resulting from dividing the total number of running words in each text, by the total number of different tabulated words in each text, are given in Table IV.

There is considerable variation in the number of words used by each author to support the more common concepts of history. For example, Muzzey uses 115 while Fish uses 261 words to each different tabulated word occurring in the list of 10,000 and above. Thus, Muzzey uses the fewest words to support his less frequently used words. Fish uses the greatest number of words. The position of West's and Thompson's textbooks shifts two ranks in the 4,000 to 10,000 column and also in the Above-10,000 column. This indicates a gain over the other texts in the use of supporting words behind each of the less frequently occurring words.

These data show considerable variation in the purposes of the authors in the preparation of these books. Beard summarizes this situation in the preface to his text as follows: "Three separate texts are used for American history teaching throughout the public schools, i. e., the primary book, the seventh- and eighth-grade book, and the senior high-school book. All seem to follow the beaten path and give fuller accounts of the *same* events and characters. To put it bluntly, we do not assume that children obtain permanent possessions from their study of history. If the study of history cannot be made truly progressive like the study of mathematics, science, etc., then the historians assume a grave responsibility in adding their subject to the already overloaded curriculum..... We have written a topical, not a narrative history. We have tried to set forth the important aspects, problems, and movements of each period, bringing in the narrative rather by illustration.....We have deliberately aimed at standards of maturity. The study of a mere narrative calls mainly for the use of the memory. We have aimed to stimulate habits of analysis, comparison, association, reflection, and generalization." In addition to these thoughts from Beard, we might add that we consider meanings as the units of history knowledge. These meanings may be symbolized by words, phrases, or other groups of words. Nevertheless, it is the meanings that must be recognized and then taught to the point of clarification in the minds of students.

While the immediate aim in this study was to establish by one objective criterion a list of concept symbols in American history, the ultimate aim was to plan a teaching program to teach the meanings or concepts for which these words are the symbols. There is a growing readiness among psychologists to admit the importance of meanings. The recent break between the philosophers, older logicians, metaphysicians, and the modern psychologists, together with the introduction of such modern ideas as are being put forth in Behaviorism and measurement[2] has led to a new interpretation of the concept "meaning." Many terms used in discussion such as faith, believe, beautiful, freedom, fact, justice, etc., constantly occur with no distinct thought as to their meaning, the speaker being guided merely by his linguistic habits and simple faith in the widespread possession of these habits. We ought to regard communication as a difficult matter, and careful thinking as a comparatively rare event. John Locke states that "Men take the words they find in use amongst their neighbors and use them confidently without much troubling their heads about a certain fixed meaning."[3] Ogden and Richards seem to feel the presence of a distinct problem in this matter of teaching a meaning, and discuss it at length.[4]

One of the modern attempts to deal with the problem of meanings is that of Professor Edmund Husserl. He states that "There has been made possible and is now on foot a new *a priori* science extracted purely from phenomenological intuition.....Between the meaning and the what-is-meant, or what is expressed, there exists an essential relation because the meaning is the expression of the meant-object through its

---

[2] For further readings see Hull, C. L. "Quantitative Aspects of the Evolution of Concepts," University of Wisconsin, Ph.D. Thesis, 1918. Also, *The Psychological Monographs*, XXVIII, No. 1, 1920, (Princeton, New Jersey: Psychological Review Company.)

Gengerelli, J. A. "Mutual Interference in the Evolution of Concepts," *American Journal of Psychology*, October, 1927.

Joachim, H. H., Russell, Bertrand, and others discuss "The Meaning of Meaning" in *Mind*, Volume 45, 1920. Ogden and Richards have an inspiring book *The Meaning of Meaning* published by Harcourt Brace & Company, 1923. The little book by Woodbridge, F. J. E. *The Realm of Mind* is an excellent philosophical treatment of the subject of meaning. It is published by the Columbia University Press, 1926. *The Proceedings of the Sixth International Congress of Philosophy*, edited by E. S. Brightman and published by Longmans Green & Co. gives a good survey of recent discussions on the subject of *meaning*. Recent yearbooks such as the *Americana*, *New International*, etc., indicate a strong tendency in this field of epistemology.

[3] Ogden and Richards. *The Meaning of Meaning*. New York: Harcourt Brace and Company, 1923.

[4] *Ibid.*

own content. We must, therefore, distinguish these three, the word, the meaning, and the object''.....

The phenomenological clarification of meanings proceeds in a threefold sequence. The meaning is illuminated by examples, then sharpened by counter-examples, and finally analyzed conceptually.....This phenomenological purification separates everything out of the meaning that it contains as strange, adulterating constituents, e.g., (1) all sensation experiences, (2) all affective reactions, and (3) all other (similar etc.) noetic meaning contents.

When the average teacher is asked to explain his procedure for teaching the meaning of the words 'institution or nationalism' the result is merely a confused state of mind. When books on methods are examined for suggestions on procedure, we find only brief and inadequate statements. It seems important that some direct, positive, and conscious system of enriching and clarifying one's concepts be put into operation. It is hoped that the lists of words suggested by this investigation may serve as an entering wedge in the production of such a system.

Many uses might be suggested for this list of words. In general the list may be used in ways similar to those recommended by Pressey[5] and Thorndike[6] in their studies. The following uses may, however, be here listed:

1. The list furnishes the teacher with a statement of the frequency with which students will meet different words in their texts.
2. The words may be used to build tests of comprehension and word meanings.
3. The list may be put into the hands of students as minimum essentials for an adequate knowledge of the subject of American history.
4. The list may serve the teacher in a similar fashion in planning the course of study.

SUMMARY OF FINDINGS

1. We have presented below a list of the 1,900 most frequently used words in senior high-school textbooks in American history.
2. About 7631 different words occur in these texts, not including the 3,000 and more that we eliminated by our criterion.
3. The first 1,900 words included all of the words found in 75 percent of the books.

---

[5] Pressey, Luella C. *Educational Research Bulletin*, Ohio State University, April 30, 1924.

[6] Thorndike, E. L. *The Teacher's Wordbook*. New York City: Columbia University Press, Columbia University, 1926.

4. The first 50 words represent a drop in frequency of occurrence from 1148 to 213.

5. Thirty-four percent of all the tabulated words occurred only once in all the eight books.

6. Forty-four percent of the tabulated words did not occur in the Thorndike list.

7. There is considerable variation in the net number of words, and in the ratio of tabulated words to net total words in the several textbooks.

8. The study represents one attempt to derive a list of the more common concepts represented in American history.

Following is a list of the 1,900 words ranking highest in frequency in this investigation. For lack of space, we have not included the frequency of occurrence of these words. The words are, however, placed in rank order according to a credit number obtained by multiplying the total frequency of occurrence in the eight texts by the number of texts in which the word occurs. All of the 1,900 words occur in at least six of the eight texts. The first 118 words occur in all the texts.

1. slavery
2. republican
3. political
4. tariff
5. colonial
6. legislature
7. convention
8. federal
9. administration
10. colonist
11. democrat
12. revolution
13. charter
14. independence
15. amendment
16. democratic
17. treaty
18. confederacy
19. frontier
20. delegate
21. organization
22. supreme
23. confederate
24. federalist
25. democracy
26. organize
27. parliament
28. politics
29. industrial
30. doctrine
31. opposition
32. revenue
33. presidential
34. decision
35. nomination
36. improvement
37. institution
38. economic
39. ally
40. resolution
41. transportation
42. chapter
43. surrender
44. treasury
45. legislation
46. plantation
47. senator
48. proclamation
49. reform
50. expedition
51. development
52. executive
53. blockade
54. international
55. currency
56. puritan
57. platform
58. internal
59. continental
60. neutral
61. declaration
62. financial
63. nominate
64. planter
65. resource
66. constitutional
67. prosperity
68. annexation
69. finance
70. suffrage
71. permanent
72. alliance
73. taxation
74. protest
75. proprietor
76. electoral
77. enterprise
78. confederation
79. sentiment
80. panic
81. reconstruction
82. whig
83. radical
84. greenback
85. civilization
86. income
87. secession
88. petition
89. inhabitant
90. monopoly

91. export
92. anti-slavery
93. ballot
94. emancipation
95. pioneer
96. progressive
97. navigation
98. ratification
99. prohibit
100. expansion
101. revolutionary
102. veto
103. leadership
104. interstate
105. competition
106. submarine
107. extension
108. construction
109. territorial
110. naval
111. presidency
112. patriotic
113. decade
114. attitude
115. conference
116. fugitive
117 hostility
118. agricultural
119. advocate
120. rebellion
121. negotiation
122. sovereignty
123. production
124. neutrality
125. restriction
126. ordinance
127. abolition
128. domain
129. repeal
130. agitation
131. abolish
132. denounce
133. seaboard
134. protective
135. resistance
136. catholic
137. controversy
138. establishment
139. opponent
140. colonization
141. militia
142. diplomacy
143. ratify
144. impose
145. warfare
146. conservative
147. exploration
148. emigrant
149. management
150. inauguration
151. legislative
152. proposal
153. secede
154. alien
155. experiment
156. unconstitutional
157. prohibition
158. responsibility
159. diplomatic
160. protestant
161. basis
162. inevitable
163. communication
164. effective
165. invasion
166. document
167. theory
168. legal
169. enthusiasm
170. obligation
171. nullification
172. federation
173. vigorous
174. ownership
175. fundamental
176. embargo
177. exclude
178. reject
179. representation
180. belligerent
181. commonwealth
182. crisis
183. importation
184. sectional
185. volunteer
186. brilliant
187. coinage
188. hostile
189. revolt
190. surplus
191. aristocracy
192. consideration
193. estimate
194. sovereign
195. employee
196. regulation
197. authorize
198. faction
199. reduction
200. commissioner
201. dominion
202. sectional
203. coinage
204. judicial
205. session
206. formal
207. conflict
208. elector
209. settler
210. jurisdiction
211. concession
212. contribution
213. capitalist
214. restrict
215. steamboat
216. unanimous
217. enforcement
218. association
219. appropriation
220. essential
221. armistice
222. persecution
223. marine
224. project
225. overwhelm
226. prominent
227. telegraph
228. traffic
229. virtual
230. characterize
231. employment
232. franchise
233. inaugurate
234. munition
235. negotiate
236. politician
237. appointment
238. restoration
239. recognition
240. deprive
241. loyalist
242. congressional
243. enact
244. redemption
245. cargo
246. assert
247. initiative
248. respective
249. outbreak
250. reëlection
251. sanction
252. approval
253. supremacy
254. cede
255. mutual
256. sedition
257. statehood
258. characteristic
259. contribute
260. explore
261. insurrection

262. Quaker
263. tyranny
264. census
265. literature
266. tradition
267. commodity
268. tradition
269. era
270. investigation
271. massacre
272. proprietary
273. recommendation
274. specie
275. welfare
276. toleration
277. referendum
278. veteran
279. distribution
280. migration
281. administer
282. ardent
283. decree
284. levy
285. mission
286. missionary
287. seaport
288. survey
289. ambassador
290. dominate
291. revision
292. interference
293. pro-slavery
294. profitable
295. writ
296. discontent
297. reverse
298. achievement
299. monarchy
300. coöperation
301. orator
302. extensive
303. career
304. disregard
305. explorer
306. historian
307. illegal
308. magistrate
309. menace
310. reservation
311. critical
312. grievance
313. socialist
314. endorse (In)
315. champion
316. reformer
317. community
318. indemnity
319. exception
320. amend
321. cultivation
322. insurgent
323. transaction
324. challenge
325. offensive
326. restraint
327. pamphlet
328. void
329. speculation
330. conversation
331. conviction
332. enactment
333. intervention
334. spindle
335. ideal
336. invade
337. destiny
338. discrimination
339. geographical
340. imperial
341. whisky
342. execution
343. primary
344. inaugural
345. cruiser
346. township
347. acquisition
348. homestead
349. sustain
350. temporarily
351. tribunal
352. precede
353. execute
354. circulation
355. servitude
356. statute
357. regiment
358. warship
359. adequate
360. facility
361. fishery
362. freemen
363. mob
364. nationality
365. security
366. redeem
367. arbitrary
368. civilize
369. mainland
370. overthrow
371. violation
372. admiral
373. deliberate
374. repudiate
375. riot
376. substantial
377. supervision
378. suspend
379. patriotic
380. patriotism
381. ultimate
382. annex
383. delegation
384. devotion
385. disposition
386. exhaust
387. resist
388. tenure
389. partisan
390. certificate
391. compact
392. judiciary
393. significant
394. output
395. treason
396. garrison
397. device
398. distinction
399. rivalry
400. smuggle
401. justify
402. incident
403. consolidation
404. qualification
405. anti-trust
406. available
407. criminal
408. fraud
409. hardship
410. genius
411. obstacle
412. reaper
413. tendency
414. profound
415. criticism
416. intellectual
417. frigate
418. interfere
419. objection
420. insurance
421. tonnage
422. education
423. existence
424. dissatisfy
425. intervene
426. proviso
427. scientific
428. shipbuilding
429. economy
430. exclusive
431. reparation
432. compensate

433. commander
434. nationalism
435. contraband
436. discussion
437. ignore
438. limitation
439. provincial
440. seamen
441. reëlect
442. assistant
443. consequent
444. populist
445. dignity
446. suppress
447. ammunition
448. confront
449. content
450. descendant
451. inflict
452. substitute
453. equipment
454. peninsula
455. agent
456. appropriate
457. despatch
458. induce
459. assumption
460. foremost
461. exposition
462. exploit
463. timber
464. ancestor
465. burgess
466. cession
467. constitute
468. covenant
469. efficient
470. implement
471. investigate
472. mileage
473. pension
474. rally
475. safeguard
476. aggression
477. creditor
478. aspect
479. impeachment
480. liquor
481. situation
482. armament
483. clamor
484. demonstration
485. enumerate
486. impress
487. interpretation
488. non-intercourse
489. predecessor
490. publication
491. recruit
492. refusal
493. intercourse
494. popularity
495. pilgrim
496. profession
497. prosecution
498. congressman
499. impressment
500. privateer
501. artisan
502. corruption
503. dissolution
504. determination
505. immigration
506. investment
507. intolerance
508. staple
509. function
510. patronage
511. resent
512. reciprocity
513. assurance
514. precept
515. contention
516. foodstuffs
517. nationalism
518. huguenot
519. starvation
520. excitement
521. outcome
522. manifest
523. evacuate
524. embody
525. imply
526. institute
527. reputation
528. bankrupt
529. comparative
530. consolidate
531. enthusiastic
532. fertile
533. poll
534. perpetual
535. provisional
536. anthracite
537. apparent
538. molasses
539. countrymen
540. injunction
541. monarch
542. disastrous
543. criticise
544. imprison
545. indispensable
546. merchantmen
547. professional
548. successor
549. squadron
550. manhood
551. tremendous
552. mint
553. denomination
554. indignation
555. speculator
556. conspiracy
557. consumption
558. confiscation
559. culture
560. encouragement
561. elaborate
562. participation
563. obnoxious
564. citizenship
565. municipal
566. compensation
567. congregation
568. conciliation
569. concentrate
570. agency
571. dominant
572. dissent
573. depression
574. defiance
575. freedom
576. subsequent
577. slaughter
578. significance
579. scheme
580. voluntary
581. aggregate
582. convict
583. dictate
584. exclusion
585. partnership
586. maintenance
587. tract
588. technical
589. coöperate
590. confirm
591. destined
592. guarantee
593. fortify
594. ratio
595. pursuit
596. locomotive
597. penetrate
598. submission
599. stronghold
600. oppression
601. redress
602. vital
603. reckless

604. ministry
605. outnumber
606. integrity
607. interpret
608. loom
609. discipline
610. distrust
611. approximate
612. dissension
613. imprisonment
614. resentment
615. textile
616. conspicuous
617. caucus
618. censure
619. disunion
620. disaster
621. despotic
622. dependents
623. ex-president
624. excessive
625. foster
626. overland
627. subordinate
628. seizure
629. nominal
630. turnpike
631. plunder
632. intelligent
633. mortgage
634. warrant
635. tolerate
636. adjustment
637. unpopular
638. covet
639. conclusion
640. assassination
641. humiliate
642. inspire
643. shrewd
644. triumphant
645. traitor
646. adjourn
647. orient
648. uprising
649. anarchy
650. exportation
651. eventual
652. enable
653. intensity
654. unsatisfactory
655. supplement
656. collapse
657. clergymen
658. calamity
659. barrier
660. arrangement
661. apportion
662. dependence
663. demonstrate
664. expectation
665. efficiency
666. hemisphere
667. fund
668. insult
669. reorganize
670. minority
671. widespread
672. unlimited
673. cherish
674. assistance
675. assault
676. colonize
677. deputy
678. fortification
679. modification
680. mineral
681. avert
682. contemporary
683. excise
684. hesitate
685. incur
686. succession
687. convert
688. ultimatum
689. transform
690. correspondence
691. competitor
692. despite
693. participate
694. separatist
695. accession
696. craft
697. explicit
698. endeavor
699. hamper
700. indignant
701. isolate
702. ruthless
703. retirement
704. responsible
705. obedience
706. reluctant
707. tyrannical
708. trader
709. confer
710. annul
711. eloquent
712. formation
713. pirate
714. outrage
715. bloodshed
716. evade
717. energetic
718. maneuver
719. unfavorable
720. tory
721. discredit
722. status
723. sympathize
724. temporary
725. distribute
726. emergency
727. humanity
728. intimate
729. percentage
730. injustice
731. isolation
732. rum
733. overseer
734. effigy
735. friction
736. indenture
737. signature
738. employer
739. naturalization
740. urban
741. consumer
742. allege
743. aggressive
744. disorder
745. emigrate
746. raid
747. puritanism
748. jury
749. reënforce
750. cavalier
751. budget
752. boycott
753. dividend
754. equivalent
755. personality
756. penalty
757. supersede
758. resumption
759. muster
760. Mormon
761. reconstruct
762. reconciliation
763. unwilling
764. membership
765. collective
766. exempt
767. endanger
768. introduction
769. philosopher
770. reconcile
771. pounds
772. battleship
773. expressly
774. enlarge

775. eliminate
776. incorporate
777. undoubtedly
778. governmental
779. complication
780. launch
781. magnitude
782. renewal
783. temperance
784. unwise
785. disarmament
786. clergy
787. attorney-general
788. leisure
789. null
790. preliminary
791. steamship
792. victorious
793. extravagance
794. expulsion
795. detail
796. inter-colonial
797. indefinite
798. buffalo
799. highway
800. intimidation
801. loyalty
802. presbyterian
803. repulse
804. taxpayer
805. tribute
806. unfair
807. unexpected
808. utmost
809. drastic
810. dissatisfaction
811. contrast
812. besiege
813. heroic
814. irritation
815. loan
816. momentous
817. prominence
818. parish
819. Pullman
820. withdrawal
821. gratitude
822. imperialism
823. unrest
824. expand
825. devastate
826. deadlock
827. commodore
828. bribe
829. bonus
830. inspiration
831. inheritance
832. manifesto
833. prolong
834. nominee
835. refrain
836. revise
837. retaliation
838. fisherman
839. financier
840. emigration
841. discriminate
842. dignify
843. consistent
844. alienate
845. ceremony
846. installment
847. prescribe
848. reaction
849. proposition
850. propaganda
851. strenuous
852. unfriendly
853. demoralize
854. renounce
855. impeach
856. vague
857. disappointment
858. baptist
859. artillery
860. inspection
861. imperative
862. navigable
863. navigator
864. asylum
865. meager
866. precise
867. notable
868. prophesy
869. renominate
870. frenzy
871. encroachment
872. corporate
873. violate
874. concentration
875. depreciation
876. deplorable
877. defensive
878. assail
879. appreciate
880. inland
881. impression
882. persistent
883. patron
884. regime
885. tributary
886. headquarters
887. exile
888. entitle
889. endow
890. aeroplane
891. stubborn
892. granger
893. founder
894. engagement
895. disavow
896. destructive
897. desperate
898. intention
899. insane
900. indirect
901. involve
902. memorable
903. primitive
904. socialism
905. sanitary
906. restrictive
907. spokesman
908. survive
909. strategy
910. abomination
911. foothold
912. external
913. fabulous
914. attribute
915. impair
916. ironclad
917. promote
918. oppressive
919. prosecute
920. remnant
921. shatter
922. sect
923. contend
924. workingman
925. astound
926. parliamentary
927. Pan-American
928. embark
929. emancipate
930. coöperative
931. condemnation
932. code
933. bondage
934. bitterness
935. assent
936. inadequate
937. oppress
938. ravage
939. statesmanship
940. underground
941. inhabit
942. humiliation
943. hemp
944. emphasize
945. lawlessness

946. journal
947. irrigate
948. promotion
949. relentless
950. slogan
951. salvation
952. revive
953. stringent
954. testimony
955. unnecessary
956. fortress
957. director
958. bullion
959. award
960. sectionalism
961. threat
962. headwater
963. tyrant
964. harass
965. envoy
966. facilitate
967. expert
968. diminish
969. dispense
970. confident
971. circular
972. anniversary
973. agitator
974. initiate
975. industrious
976. impartial
977. invader
978. petroleum
979. notorious
980. non-partisan
981. readjustment
982. subsidy
983. Tammany
984. unsuccessful
985. unscrupulous
986. unity
987. uniformity
988. valiant
989. crude
990. disadvantage
991. gag
992. denial
993. arbitrate
994. intelligence
995. landlord
996. rebate
997. overshadow
998. originate
999. testify
1000. verge
1001. fertility
1002. gunboat
1003. anti-federalist
1004. anticipate
1005. academy
1006. partisanship
1007. scarcity
1008. revolutionize
1009. sympathizer
1010. avow
1011. involuntary
1012. revival
1013. Bible
1014. eminent
1015. duel
1016. dissenter
1017. handicap
1018. fraudulent
1019. constitutionality
1020. colleague
1021. coercion
1022. arsenal
1023. array
1024. amnesty
1025. contemplate
1026. interruption
1027. intrigue
1028. lavish
1029. mobilize
1030. profess
1031. persist
1032. persecute
1033. respectable
1034. skillful
1035. rumor
1036. unconditional
1037. feudal
1038. equality
1039. protectorate
1040. forbade
1041. fluctuate
1042. discontinue
1043. discretion
1044. competitive
1045. chancellor
1046. attractive
1047. preference
1048. plurality
1049. reëstablish
1050. reliance
1051. torpedo
1052. wrest
1053. cessation
1054. defect
1055. compulsory
1056. administrative
1057. achieve
1058. accumulation
1059. humane
1060. moderation
1061. merchandise
1062. paralyse
1063. objectionable
1064. registration
1065. sloop
1066. terminate
1067. transmit
1068. transcontinental
1069. troublesome
1070. unoccupied
1071. vicious
1072. anarchist
1073. obvious
1074. depreciate
1075. prestige
1076. preparedness
1077. rebuke
1078. shilling or (s)
1079. runaway
1080. strategic
1081. swamp
1082. free-silver
1083. parallel
1084. comprise
1085. Jacksonian
1086. typical
1087. gratify
1088. enroll
1089. embarrass
1090. conciliatory
1091. mansion
1092. modify
1093. mugwump
1094. prime
1095. populous
1096. picturesque
1097. oriental
1098. providence
1099. spectacular
1100. tactics
1101. systematic
1102. trapper
1103. undesirable
1104. vanquish
1105. exasperate
1106. conception
1107. popeless
1108. preëmption
1109. outburst
1110. reclamation
1111. rejection
1112. resignation
1113. reside
1114. shipowner
1115. ridicule
1116. aristocrat

1117. verdict
1118. disturbance
1119. deliberation
1120. brutal
1121. activity
1122. ineffective
1123. ignorance
1124. program
1125. preamble
1126. pend
1127. superiority
1128. sympathetic
1129. suspect
1130. thrive
1131. unlawful
1132. upheaval
1133. wrangle
1134. commander-in-chief
1135. cavalry
1136. infamous
1137. forsee
1138. evacuation
1139. enlist
1140. culminate
1141. crusade
1142. historical
1143. lawful
1144. prior
1145. refugee
1146. simplicity
1147. scandal
1148. toll
1149. trustee
1150. waterway
1151. vindictive
1152. outpost
1153. guerilla
1154. formulate
1155. exploitation
1156. expire
1157. enrich
1158. encroach
1159. emerge
1160. diplomat
1161. dependency
1162. continuous
1163. civilian
1164. audience
1165. acquiescence
1166. inherit
1167. impressive
1168. logical
1169. maritime
1170. selective
1171. scholar
1172. derive
1173. salient
1174. solution
1175. suspicious
1176. utterance
1177. wharf
1178. worthless
1179. graduate
1180. expel
1181. entangle
1182. inferior
1183. inconsistent
1184. impulse
1185. intoxicate
1186. oration
1187. reflect
1188. reënact
1189. sanitation
1190. plunder
1191. stockholder
1192. utility
1193. gigantic
1194. factor
1195. erection
1196. dishonor
1197. inducement
1198. hereditary
1199. assessment
1200. postmaster
1201. liable
1202. loyal
1203. magazine
1204. passionate
1205. siege
1206. stipulate
1207. thwart
1208. flatboat
1209. grandson
1210. enlistment
1211. diversify
1212. disgust
1213. apportionment
1214. creation
1215. constituent
1216. cartoon
1217. cautious
1218. backwoodsman
1219. ascribe
1220. apprehension
1221. amicable
1222. literary
1223. manifestation
1224. molest
1225. metropolis
1226. musket
1227. obstruct
1228. oath
1229. reception
1230. publicity
1231. promoter
1232. requirement
1233. scientist
1234. stagger
1235. subtreasury
1236. sturdy
1237. vault
1238. validity
1239. impoverish
1240. suitable
1241. perplex
1242. supporter
1243. treasurer
1244. antagonism
1245. episode
1246. Episcopal
1247. elevator
1248. dynasty
1249. devise
1250. curtail
1251. confiscate
1252. complicate
1253. apology
1254. constructive
1255. adversary
1256. lieutenant
1257. mandate
1258. minimum
1259. mercantile
1260. pilot
1261. pretense
1262. supervise
1263. subscribe
1264. unbroken
1265. vengeance
1266. bolshevist
1267. prerogative
1268. geography
1269. extravagant
1270. extinction
1271. disposal
1272. interlock
1273. infinite
1274. dedicate
1275. consul
1276. antagonist
1277. agitate
1278. enlighten
1279. detachment
1280. liability
1281. magnate
1282. postmaster-general
1283. rescind
1284. response
1285. unemployed
1286. wasteful

1287. habeas corpus
1288. explanation
1289. eloquence
1290. domination
1291. disability
1292. bishop
1293. conciliate
1294. interval
1295. incompetent
1296. conscription
1297. collision
1298. compete
1299. courtesy
1300. cable
1301. comparison
1302. battery
1303. alternative
1304. lament
1305. migrate
1306. medieval
1307. predict
1308. periodical
1309. paramount
1310. non-importation
1311. swine
1312. survivor
1313. surpass
1314. stimulus
1315. taunt
1316. tact
1317. transfer
1318. tropical
1319. turmoil
1320. unionist
1321. uncompromising
1322. uncertainty
1323. investor
1324. indulge
1325. coerce
1326. centralize
1327. reinforcement
1328. expend
1329. mechanical
1330. unskilled
1331. freehold
1332. forcible
1333. expunge
1334. exhorbitant
1335. discord
1336. disband
1337. concert
1338. impetus
1339. czar
1340. assassin
1341. adventurous
1342. accord
1343. accomplishment
1344. merciless
1345. preside
1346. reluctance
1347. prostrate
1348. separation
1349. scruple
1350. rotation
1351. traverse
1352. warehouse
1353. expedient
1354. desirable
1355. dislike
1356. emphasis
1357. insistence
1358. indictment
1359. incidental
1360. beneficent
1361. avail
1362. architecture
1363. arbitrator
1364. license
1365. justification
1366. manor
1367. memorial
1368. medium
1369. patrol
1370. relinquish
1371. refinery
1372. skirmish
1373. surveyor
1374. utilize
1375. whale
1376. ensue
1377. incessant
1378. decrease
1379. debtor
1380. aristocratic
1381. lawmaker
1382. mariner
1383. occasional
1384. rebellious
1385. reënforcement
1386. suggestion
1387. distill
1388. bullet
1389. powerless
1390. trend
1391. hatred
1392. hamlet
1393. ferry
1394. disobey
1395. junction
1396. invincible
1397. indigo
1398. bombard
1399. bomb
1400. assimilate
1401. assassinate
1402. mackerel
1403. innumerable
1404. monopolize
1405. procession
1406. pacification
1407. newcomer
1408. negative
1409. firmness
1410. destitute
1411. incentive
1412. patron
1413. par
1414. specify
1415. sincerity
1416. sermon
1417. senatorial
1418. scalawag
1419. revoke
1420. resume
1421. supplant
1422. statistics
1423. turpentine
1424. unduly
1425. irritable
1426. irresistible
1427. intrust
1428. crusader
1429. adjournment
1430. monetary
1431. naturalize
1432. Renaissance
1433. stalwart
1434. spiritual
1435. triple
1436. uncertain
1437. futile
1438. expiration
1439. disapprove
1440. Jesuit
1441. insignificant
1442. inefficient
1443. deserter
1444. conform
1445. misunderstand
1446. wholesome
1447. bulwark
1448. brotherhood
1449. bribery
1450. borough
1451. bombardment
1452. anxiety
1453. acceptance
1454. lookout
1455. major
1456. nationalize
1457. populace

1458. philanthropist
1459. persuasion
1460. noncombatant
1461. recapture
1462. stagecoach
1463. schoolmaster
1464. talent
1465. theme
1466. traditional
1467. withheld
1468. tenant
1469. foreshadow
1470. fabric
1471. denunciation
1472. completion
1473. colonel
1474. carpetbag
1475. bayonet
1476. auspices
1477. argue
1478. mediation
1479. meantime
1480. manager
1481. mutiny
1482. philosophy
1483. peril
1484. resolute
1485. shipment
1486. steadfast
1487. heritage
1488. irresponsible
1489. secessionist
1490. unreasonable
1491. unprecedented
1492. witchcraft
1493. forfeit
1494. epithet
1495. invisible
1496. primogeniture
1497. forge
1498. fateful
1499. exigency
1500. exemption
1501. delusion
1502. expression
1503. discard
1504. dramatic
1505. disclaim
1506. discard
1507. dictator
1508. intensify
1509. insistent
1510. inscription
1511. illiterate
1512. hospitality
1513. defiant
1514. assertion
1515. ascertain
1516. aggressor
1517. adulterate
1518. admiration
1519. adhere
1520. abound
1521. ability
1522. productive
1523. precaution
1524. postpone
1525. posterity
1526. quota
1527. pence (or) (d)
1528. severity
1529. seacoast
1530. scandalous
1531. thresh
1532. treasonable
1533. undisputed
1534. offender
1535. vehement
1536. guidance
1537. flagrant
1538. exceptional
1539. exaggeration
1540. duration
1541. divert
1542. irregular
1543. interposition
1544. horseback
1545. cowboy
1546. Christianity
1547. artificial
1548. continuance
1549. malicious
1550. predominance
1551. outlay
1552. regardless
1553. redeemable
1554. subscription
1555. untouched
1556. unrestricted
1557. venerable
1558. expensive
1559. exhaustion
1560. effectual
1561. indebtedness
1562. chairman
1563. affirm
1564. depredation
1565. arrest
1566. additional
1567. livelihood
1568. martial
1569. petty
1570. requisition
1571. treachery
1572. wharve
1573. shameful
1574. hazard
1575. guardian
1576. fiscal
1577. fertilizer
1578. extinguish
1579. extermination
1580. enumeration
1581. emphatical
1582. editor
1583. editorial
1584. disrepute
1585. dishearten
1586. disable
1587. devout
1588. intellect
1589. inherent
1590. indorsement
1591. inclination
1592. incite
1593. impetuous
1594. defer
1595. curb
1596. craftsmen
1597. correspond
1598. comply
1599. compliance
1600. combat
1601. claimant
1602. abandonment
1603. archduke
1604. armory
1605. announcement
1606. advocacy
1607. adherence
1608. accusation
1609. acceptable
1610. abridge
1611. legislate
1612. legalize
1613. maximum
1614. portage
1615. polygamy
1616. resemblance
1617. requisite
1618. repudiation
1619. reorganization
1620. reformation
1621. spoilsman
1622. servile
1623. senatorship
1624. superb
1625. sterling
1626. theoretical
1627. theology
1628. unorganized

1629. vigilance
1630. applause
1631. conscientious
1632. animosity
1633. historic
1634. motto
1635. respond
1636. arouse
1637. acquittal
1638. graft
1639. frugal
1640. methodist
1641. detach
1642. diary
1643. illustration
1644. ingenuity
1645. ram
1646. readmit
1647. surgeon
1648. schedule
1649. romantic
1650. role
1651. contestant
1652. contemptuous
1653. coercive
1654. bituminous
1655. baffle
1656. argument
1657. adventurer
1658. Americanization
1659. admirable
1660. generosity
1661. ferment
1662. disgraceful
1663. disfranchise
1664. lucrative
1665. intimidate
1666. grange
1667. oratory
1668. traitorous
1669. freeholder
1670. merchant-marine
1671. staunch
1672. impose
1673. klan
1674. liberation
1675. convey
1676. countryside
1677. crystalize
1678. destination
1679. equilibrium
1680. explosion
1681. extremist
1682. exhalant
1683. gin
1684. annihilate
1685. bimetallism
1686. conspirator
1687. constable
1688. recede
1689. repel
1690. retaliate
1691. scope
1692. stockade
1693. thrifty
1694. unable
1695. unfit
1696. vocational
1697. wanton
1698. morality
1699. policeman
1700. profiteer
1701. quorum
1702. reality
1703. spur
1704. suppression
1705. usurpation
1706. vicinity
1707. minutemen
1708. monopolistic
1709. obscure
1710. operative
1711. pulpit
1712. hesitation
1713. impregnable
1714. infantry
1715. ingenious
1716. intrench
1717. legitimate
1718. major-general
1719. millionaire
1720. courageous
1721. courtier
1722. deficit
1723. displace
1724. diversity
1725. dominion
1726. elective
1727. engineer
1728. enhance
1729. entreaty
1730. epoch
1731. frightful
1732. amid
1733. chattel
1734. clash
1735. consume
1736. convene
1737. revolutionist
1738. ruffian
1739. sever
1740. bondsman
1741. adherent
1742. outstanding
1743. advertisement
1744. blur
1745. outskirts
1746. initial
1747. melancholy
1748. discern
1749. essay
1750. extremity
1751. gateway
1752. temptation
1753. transit
1754. ostensible
1755. rioter
1756. schooner
1757. scythe
1758. remonstrance
1759. clumsy
1760. boxer
1761. alignment
1762. fanatic
1763. demonetization
1764. marshal
1765. issuance
1766. interoceanic
1767. innovation
1768. impracticable
1769. prairie
1770. pathfinder
1771. pacifist
1772. officeholder
1773. nobility
1774. nucleus
1775. vanguard
1776. vindictive
1777. wireless
1778. uninhabited
1779. tar
1780. site
1781. revert
1782. reclaim
1783. recreation
1784. relax
1785. centennial
1786. centralization
1787. cereal
1788. chieftain
1789. heresy
1790. abide
1791. absorb
1792. communistic
1793. destructive
1794. apostle
1795. armada
1796. astonishment
1797. atrocity
1798. behalf
1799. beneficial

1800. flax
1801. demonetize
1802. desirability
1803. emotion
1804. faculty
1805. conversion
1806. languish
1807. literal
1808. invest
1809. irreconcilable
1810. irrepressible
1811. insert
1812. incense
1813. individuality
1814. indomitable
1815. inexhaustible
1816. preëminent
1817. premier
1818. probability
1819. protestation
1820. sneer
1821. stability
1822. guardianship
1823. hinderance
1824. postal
1825. pottery
1826. offset
1827. overture
1828. observance
1829. obstinate
1830. miserable
1831. murderous
1832. native-born
1833. unique
1834. unselfish
1835. unsparing
1836. usher
1837. tenacious
1838. terrorize
1839. trainmen
1840. stationary
1841. provost
1842. gentry
1843. salute
1844. frontiersman
1845. serf
1846. sensitive
1847. coastwise
1848. equip
1849. scrutiny
1850. royalist
1851. rouse
1852. ridiculous
1853. revelation
1854. capacity
1855. comprehension
1856. consternation
1857. recourse
1858. redouble
1859. annals
1860. appointee
1861. admission
1862. expansionist
1863. demarcation
1864. diligence
1865. discouragement
1866. disloyal
1867. displeasure
1868. elapse
1869. enfranchisement
1870. jail
1871. merge
1872. manipulation
1873. legislator
1874. instinct
1875. influx
1876. indecisive
1877. implication
1878. impend
1879. householder
1880. high-minded
1881. smelt
1882. procedure
1883. protectionist
1884. pastor
1885. override
1886. outstrip
1887. ominous
1888. monstrosity
1889. misfortune
1890. willingness
1891. wholesale
1892. weaver
1893. vindication
1894. vehicle
1895. unusual
1896. unofficial
1897. torture
1898. tenement
1899. remit

SAVING TIME IN SPELLING INSTRUCTION

C. P. Archer
State Teachers College, Moorhead, Minnesota

In a crowded curriculum any evidence which makes possible the saving of time in teaching is always welcome. Elimination of waste effort makes possible the teaching of many things which would otherwise have to be excluded. A more intimate knowledge of exactly what takes place in a program of instruction is helpful in the elimination of waste in teaching time.

Evidence seems to point to the fact that learning to spell one word effects a very large number of other words. It may result in either improvement or loss in ability to spell related words.

There are only three sources of ability to spell words:

1. A child may learn to spell the words directly.
2. He may inherit the ability.
3. He may transfer the ability from some other phase of learning.

Teachers who have taught spelling know that children can spell words which they have never studied. Research also reveals the fact that many words are spelled correctly in tests when the child never studied the words before. It is evident, then, that not all of the words which a child is able to spell are the result of direct instruction. No biologist would admit the possibility of inheritance of such a specific trait. Then the child must learn many words by transfer.

Possible sources of transfer may be the following:

1. The child may transfer his observation of a word from reading or other school subjects.
2. He may transfer from contacts with words outside of school from signs, advertisements, newspapers and the like.
3. He may transfer from other words previously studied which possess in common with the transfer form syllables, groups of syllables, or principles of construction.

A knowledge of the extent and character of the incidental learning is necessary if waste effort is to be eliminated and time saved. If time is to be saved in learning, and difficulties avoided in the form of inhibitions we must have a knowledge of the character and extent of transfer. An intelligent organization of the spelling course of study will demand evidence to show whether the words being taught today make it unnecessary to teach certain other words tomorrow. We must know whether the words being taught to-day will destroy the learning built up the day be-

fore. The ostrich may think he is hiding from his enemy merely by sticking his head in the sand, and man may think he is solving the problems of spelling merely by dealing with individual words in isolation, but the individual acts as a unit. Each experience changes the existing body of knowledge especially with reference to those functions which are similar.

In an attempt to throw some light on this whole problem of what effect the study of one word has upon another in all types of conditions and complexities, the writer planned and conducted a series of three experiments. An attempt will be made to state briefly the general plan of the experimental work, a few results, and certain general conclusions which may be drawn from the same. The purpose of the series of experiments may be summarized as:

1. To determine the effect of the study of a word upon selected derived forms and vice versa.
2. To determine the effect of words upon others which are not derived forms but similarly constructed.
3. To determine the effect of the study of words upon others where principles of construction are directly opposed.
4. In case of transfer, to determine the effect of the factors of intelligence, sex, nationality, maturity, spelling ability, and word difficulty upon the same.

A series of words were selected on the following basis:

1. Social utility.
2. Difficulty.
3. Ability of the child to see the meaning.
4. Types of words from which the same derived forms could be built.
5. To base forms of words were added the most commonly used prefixes and suffixes.
6. Certain other words were added where the principle of construction was directly opposed.

In experiment one, a fifth grade list of words like those shown in Table I was used.

The seventh grade list was made up of the same type of words but slightly more difficult. There were fifteen word-groups of four words in each group. A word-group in this experiment consists of a base form and certain derived forms made by adding "s", "ed", and "ing". To these fifteen word-groups were added other derived forms made up by

TABLE I

RECORD OF WORDS USED IN EXPERIMENT ONE, GRADE FIVE

CLASS A	CLASS B	CLASS C	CLASS D
*reflect	reflects	reflected	reflecting
guard	*guards	guarded	guarding
acquaint	acquaints	*acquainted	acquainting
amend	amends	amended	*amending
*exhibit	exhibits	exhibited	exhibiting
proceed	*proceeds	proceeded	proceeding
exist	exists	*existed	existing
install	installs	installed	*installing
*consider	considers	considered	considering
correspond	*corresponds	corresponded	corresponding
recollect	recollects	*recollected	recollecting
confirm	confirms	confirmed	*confirming
*assign	assigns	assigned	assigning
prompt	*prompts	prompted	prompting
register	registers	*registered	registering

Similar forms on which children were only tested:

collected	responding	consigned	remind

*The words starred make up the study list for Class I.

dropping or adding a prefix. Thus a total list of sixty-four words was used in the fifth grade.

The general procedure was as follows:

1. The plan involved preliminary, final, and delayed recall tests of all sixty-four words with study on fifteen words only, to check transfer to other forms.

2. Each experiment required one school week and one day extra for completion.

3. End tests of the sixty-four words were given on Monday, Friday, and on Friday three weeks later as preliminary tests, final tests, and delayed recall tests, respectively.

4. A total of forty-minutes of study of fifteen words out of the sixty-four was provided between Monday and Friday of the first week using the method of "testing all words before teaching."

5. In all tests sentences were used to indicate meaning.

6. Experimental groups consisting of approximately 500 children in each of the fifth and seventh grades were used.

7. The experimental group in each grade was divided into five classes. Each class of approximately 100 children studied the same end tests.

8. The 1000 children were taught by the forty-eight teachers in thirty school systems in Iowa and Minnesota.

9. Control groups consisting of thirty children per grade were given the end-tests only with no study on any form.

10. In all end-tests the child was prevented from checking back on previous spellings of other forms of the same word by using separate slips of paper.

The papers were scored by marking separately, errors in the base of each word, errors in the suffix, and errors in the junction point between suffix and base. In the case of changed prefixes, errors were recorded separately for the prefix, the junction between the prefix and the base of each word, as well as in the base form itself. The method of scoring is shown in Table II.

Records of the total number of errors in final and delayed recall tests were each subtracted from the preliminary test and difference recorded as improvement for each pupil. Average improvements on each separate form were computed.

In connection with the results the following questions will be answered briefly:

1. Does transfer improve the ability to spell words not studied?
2. Does negative transfer operate to decrease efficiency or build up inhibitions against learning words?
3. What is the unit of transfer?
4. What are some conditions associated with transfer?
5. What conclusions may be drawn?

Tables II and III are distributions showing the improvement in Class A (fifth and seventh grades respectively) which studied base forms. Average and probable errors are shown. The average improvement based on immediate recall of all such distributions are summarized in Tables IV and V.

TABLE II

EXPERIMENT I, FIFTH GRADE

Distributions showing the improvement of Class A, (base form studied). Improvement based on immediate recall.

No. of words	Base form	"S" form	"Ed" form	"Ing" form
15	2	2	2	2
14	2	1	3	2
13	2	4	3	4
12	5	4	3	2
11	13	14	13	13
10	11	10	10	11
9	15	15	17	14
8	13	13	9	14
7	9	10	11	9
6	8	8	9	9
5	5	4	5	4
4	7	7	7	5
3	4	4	3	6
2	4	4	3	4
1	1	1	3	2
Totals	101	101	101	101
A.M.	8.128	8.158	8.089	8.019
P.E. A.M.	.207	.206	.214	.214
S.D.	3.092	3.082	3.203	2.193

TABLE III

Experiment I, Seventh Grade

Distributions showing the improvement of Class A, (base form studied). Improvement based on immediate recall.

No. of words	Base form	"S" form	"Ed" form	"Ing" form
15				
14	1	1	1	
13	1	1	1	2
12	2	2	2	2
11	5	5	5	4
10	10	10	10	10
9	8	8	8	8
8	6	7	8	7
7	12	12	10	10
6	13	12	14	15
5	11	11	11	11
4	13	14	13	13
3	9	9	9	9
2	8	8	8	8
1	6	6	6	7
Totals	106	106	106	106
A.M.	6.150	6.132	6.150	6.028
P.E. $_{A.M.}$	.201	.201	.201	.199
S.D.	3.073	3.080	3.077	3.057

TABLE IV

Experiment I, Fifth Grade, Experimental Group

Mean improvement by study and transfer in immediate recall tests. The form which was studied is underlined. The last is a mixed form.

Class	Base Form		"S" Form		"Ed" Form		"Ing" Form	
	A.M.	P.E.	A.M.	P.E.	A.M.	P.E.	A.M.	P.E.
A	8.128	.207	8.158	.266	8.089	.214	8.019	.214
B	8.555	.216	8.428	.217	8.409	.216	9.238	.223
C	7.878	.219	7.859	.204	8.868	.220	7.810	.219
D	8.661	.204	8.641	.204	8.680	.235	8.777	.206
1	4.736	.181	4.162	.176	4.662	.172	6.632	.224
Control Group	.766	.192	.766	.192	.766	.192	.766	.192

Mean Improvement for Class I was 5.486, P. E.$_{A.M.}$ .228

TABLE V

Experiment I, Seventh Grade

Mean improvement by study and transfer in immediate recalls. The study forms are underlined. The last is a mixed form.

Class	Base Form		"S" Form		"Ed" Form		"Ing" Form	
	A.M.	P.E.	A.M.	P.E.	A.M.	P.E.	A.M.	P.E.
A	6.150	.201	6.132	.201	6.150	.201	6.028	.199
B	5.878	.239	5.821	.235	5.812	.238	5.793	.236
C	5.712	.212	5.452	.198	5.693	.213	5.693	.216
D	5.460	.220	5.400	.224	5.430	.231	5.560	.227
1	4.750	.181	4.103	.179	3.883	.178	4.250	.157
Control Group	1.111	.195	1.111	.196	1.111	.195	1.111	.195

Improvement in study of mixed forms, Class I, A.M. 5.956, P.E. $_{A.M.}$ .241

TABLE VI

Experiment I, Seventh Grade

Mean improvement by study and transfer in delayed recalls. The study forms are underlined for each class. The last is a mixed form.

Class	Base Form		"S" Form		"Ed" Form		"Ing" Form	
	A.M.	P.E.	A.M.	P.E.	A.M.	P.E.	A.M.	P.E.
A	5.557	.183	5.548	.182	5.529	.181	5.458	.182
B	5.142	.210	5.180	.207	5.151	.210	5.018	.214
C	4.606	.173	4.625	.178	4.616	.177	4.589	.175
D	4.620	.206	4.600	.206	4.530	.202	4.450	.214
1	4.764	.177	4.221	.169	4.030	.169	4.339	.162

Class I study forms A.M. 5.486, P.E. $_{A.M.}$ .223

These data indicate that transfer occurred almost perfectly from the base form to the other derived form of the word group. It will be noticed that the average improvement for the study forms and the transfer forms are about equal. There being no significant difference between them. The significant difference in improvement of all experimental groups over the control groups indicate that improvement must have been due to transfer from the study function. The average improvement based on delayed recall is shown for one grade in Table VI which is typical of the data in the other grade.

In experiment two, types of words were used where the final silent "e" drops when "ing" is added. As far as errors in the base of the word was concerned the same kind of positive transfer occurred as in the data previously shown. Here, however, an additional derived form was added. In the case of words where the sound of the word was changed by the addition of a suffix, as in "decide" and "decision," little transfer occurred between the changed form and the others of the group.

In experiment three, words were selected which double the final consonant when adding the suffixes "ed" and "ing." Certain other words were thrown in as checks. As far as errors in the base of the word are concerned the same kind of positive transfer occurred as in the other two experiments.

To the question, "Did the study of one word decrease the efficiency of spelling other words?" we must answer in the affirmative in certain cases. The writer marked separately the errors made in the use of final silent "e". When children studied the base form, such as "decide," they improved in the tendency to drop the "e" on the form studied, but having learned the words with the "e" attached, the tendency was greater to retain it when adding the "ing" than before study. This is shown by the fact that there was a negative improvement in the total number of errors for the class as a whole.

When the children studied the "ing" forms, such as "deciding" with no "e" attached the tendency was to leave off the "e" on the base form and on the "s" form as shown by the fact that there were more errors in the use of final silent "e" in the two transfer forms than before study.

The writer also has evidence to show that when the child studied words like "indicating" in which the final silent "e" is dropped, more errors are made in the use of final "e" in words like "canoeing" than before study.

When a child studies words like "prefer," it interferes with his ability to spell "preferring" as more children make errors in doubling the final consonants after study on a base form than before study. Also, if a child studies words like "prefers" he is likely to have difficulty with doubling the final consonant as shown by the fact that there was negative improvement in the "ed" and "ing" forms when only errors in doubling the final consonant were considered. Furthermore, when the child studies words like "excelled" he is likely to spell "excel" with two l's as shown by the fact that a negative improvement resulted from the check of errors in doubling the final consonant only.

If a child studies words like "compelling" the tendency to double the final consonant is generalized and so the child is likely to spell "compel" with two "l's."

The writer also has evidence to show that if we teach the child a series of words in which the final consonant is doubled when the suffixes "ed" or "ing" are added, the child will transfer that generalized procedure over to words like "benefited" and "counseled."

The preceding evidence leads us to see that transfer does take place from one word to another sometimes resulting in an increase of the ability to spell the transfer form and sometimes to interfere with the correct spelling of the unstudied form. Another question of vital importance would be, "How fine are the units of transfer?" The series of experiments yield some evidence on this point.

TABLE VII

UNIT OF TRANSFER—FIFTH GRADE (CLASS A)

STUDY FORM			TRANSFER FORMS		
	No. misspelling	Improvement		No. misspelling	Improvement
assign	56	41	consigned	37	24
amend	17	16	remend	14	13
reduce	36	33	induce	30	24
create	19	19	recreate	20	17
prefer	31	30	referring	26	26
admit	34	32	submit	18	17

(Errors in base only considered)

Table VII shows the improvement in study forms together with the improvement in transfer forms. This table means that 56 children misspelled the word "assign" in a preliminary test, of which number 41 spelled it correctly after study. Of these 56 children, 37 misspelled "consigned" in a preliminary test. Without any study on the word "consigned" but after studying the word "assign," 24 of the 37 spelled the word correctly. It is evident from these data that the unit of transfer may be as small as a single syllable.

Among the factors which might be checked as associated with transfer are sex, grade, word difficulty, nationality, intelligence. As shown by the following data there was no significant difference between the transfer ability of boys and girls.

TABLE VIII

COMPARISON OF SEXES IN AMOUNT OF TRANSFER—7TH GRADE

	Base Form		"Ing" Form	
	Boys	Girls	Boys	Girls
A.M.	9.199	9.450	8.898	9.111
P.E.	.292	.260	.254	.248
Difference		.257	.213	
P.E. of dif.		.390	.353	
Index of significance		.643	.603	

The data below shows that for most of the transfer forms there was little difference in the transfer ability of the fifth and seventh grade, though it appeared that the seventh grade was more likely to master a larger number of words in study than the fifth grade.

TABLE IX

COMPARISON OF 5TH AND 7TH GRADES ON IMPROVEMENT BY TRANSFER

The children misspelled the same number of words in the beginning.

	Base Form		"Ing" Form	
	7th	5th	7th	5th
A.M.	9.325	9.665	8.993	9.755
P.E.	.185	.133	.195	.132
A.M.				
Difference between		.340	.765	
P.E. of difference		.225	.234	
Index of significance		1.511	3.269	

The difficulty of the word does not appear to be a factor in transfer though it is a factor in learning. A word once mastered will transfer regardless of difficulty, other things being equal.

Intelligence as here tested did not appear to be a factor as shown by low correlations given in Table X.

For reasons given in the next paragraph the writer selected children who misspelled ten or more words. Their intelligence quotients obtained by Haggerty Intelligence Examination, Delta I was correlated with improvement in certain forms selected at random. Improvement in the study form for each class was eliminated and only improvement in transfer forms was used. In Table X all of the transfer improvement in Experiment I was used. Table X may be explained as follows: All of the children in all classes who spelled enough words to get an adequate measure of transfer were used. The children's transfers from such forms

as "reflects", "reflected", and "reflecting" which had been studied by the several classes to such base forms as "reflect" were recorded as amounts of improvement and when correlated with intelligence quotients was .057 plus or minus .044. Likewise, all other forms studied but transferred to the "ing" form were correlated with intelligence.

TABLE X

RELATION OF INTELLIGENCE TO TRANSFER-WORD DIFFICULTY HELD CONSTANT

Transfer form	Grade	r.	P.E. of r.
base	7	.057	.044
"Ing"	7	.071	.069
base	5	.112	.103
"Ing"	5	.105	.106

The writer selected all cases which misspelled ten to fifteen study words as it seemed evident that the number of words misspelled in the beginning would affect the opportunity for improvement in study and consequent possibility for transfer. Still the correlations are low. One should be careful to point out however, that the assorted cases may be those possessing bad habits or other factors which tend to break down the correlation. Under other circumstances with other material where there are better opportunities to check varying degrees of transfer for all intelligence levels, intelligence may prove to be a very important factor in transfer.

The Scandinavians showed superior transfer ability to either the British or German subjects by as high as four or five times the probable errors of the differences of the average of the nationality groups.

As a result of these data one may draw the following conclusions:

1. Positive transfer occurred in about equal amounts between base, "s," "ed" and "ing" forms.

2. Positive transfer was not as great between "tion" and other forms.

3. Negative transfer occurred from base to "ing" form in the case of final silent "e," also the reverse.

4. Negative transfer occurred from base and "s" forms to "ed" and "ing" forms in the doubling of final consonant. (Also to different forms such as "canoeing," etc.)

5. Transfer occurred to words with prefixes added and also to words with prefixes removed.

6. A unit of transfer is as small as one syllable in the cases checked here.

7. Transfer occurred with both difficult and easy words.

8. There is no difference in the transfer ability of boys and girls.

9. There is no difference between the 5th and 7th grades in ability to transfer.

10. Intelligence as here tested is not a factor in transfer of this kind.

11. The Scandinavians show superior transfer ability to the British and in most cases to German subjects.

12. Transfer occurred in proportion to similarity of material.

13. Children generalized in the use of final silent "e" and doubling of the final consonant.

14. This generalization transferred to increase efficiency in some cases and decrease it in others.

15. As it is evident that children will do their own generalizing anyway, it seems wise to try to guide it correctly.

EDITORIALS

RESEARCH NEEDED TO ADJUST HIGH SCHOOL CURRICULA TO EDUCATIONAL NEEDS OF THE INDIVIDUAL

For many years we have been talking about individual differences and the need of adjusting the school to the child. At first we attempted to do this by means of such administrative devices as semi-annual promotions, Batavia plan, Cambridge plan, Pueblo plan, etc. Essentially, these considered time and teaching the only adjustment needed to enable all children to master the same content with advantage.

Later, homogeneous grouping of pupils appeared as another means of adjusting to individual differences, with all the arguments of equalized competition, success vs. failure, etc., emphatically proclaimed. Again, however, change of content was usually insignificant and the adjustment was often more in form than in actuality. Minimum essentials, enriched curricula, individual instruction, contract plan, have likewise been terms to conjure with, though whether or not these have been conceived in terms of individual differences of actual children, has often been a matter of uncertainty.

More recently we have been talking about setting up our curricular offerings to meet the needs of pupils, thereby solving, in part at least, the question of individual differences. This has been particularly true in the secondary school field. For one who critically faces this proposal, the question must needs arise,—what constitutes a *need?* How are the specific *needs* of individuals to be ascertained? How are these needs to be distinguished from the general school aims and set off for treatment? Shall the high school be a fitting school for the broader life and for citizenship, a preparatory school for college and the professions, or a trade school?

Manifestly, such a multiplicity of aims is impossible in the great majority of schools since the number of pupils is small and the faculty of teachers would need to be very large in proportion. Even where such diverse curricula can be offered, there still remains the problem of guidance of each pupil in the selection of work according to his individual needs, interests, aptitudes, and social values. These are all factors which are very variable and of which our knowledge is very inadequate.

There is a crying need for research on this problem. Curricula are being built and modified on the basis of opinion of need with little or no data to support. Who is attacking this problem and how?

E. J. A.

PLANNING A YEAR'S GROWTH

Everyone is planning—principals and superintendents for better organization, better buildings, better teachers, and better teaching; supervisors for better courses of study, better methods of teaching, and for individual adjustment and progress; teachers for better relations with their pupils, for more skill in teaching, and for higher standards of attainment. Everyone is planning for something new and better.

An interesting feature about all of these plans is that they are all for the school. This is wonderfully fine, but the ultimate well-being of the school systems demands that teachers, principals, supervisors, and superintendents plan also for themselves. The question then naturally arises—What, then, will this year's work bring to you in increased growth?

In the first place, not much growth is going to result if the matter is left to chance experiences and odd time. Some people just take things as they come, drift along, work hard, and learn little. To get growth there must be vigorous mental activitiy to some well-recognized goal.

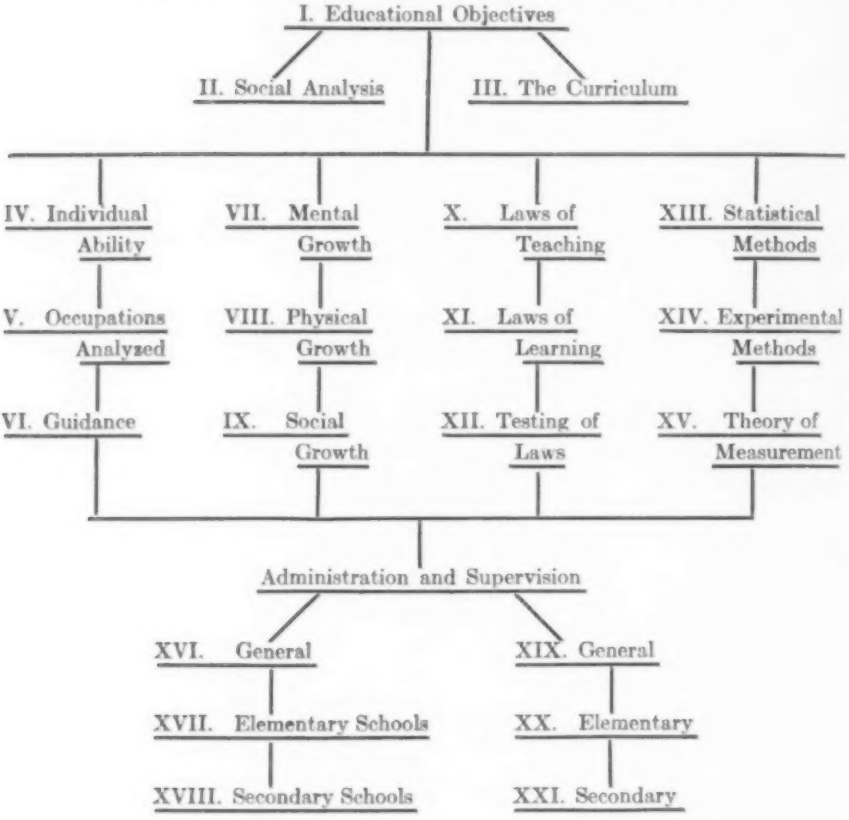
The steps in planning a program are *diagnosis, instruction,* and *measurement.* There will be reading, reflection, and experimental manipulation. Of course we all plan to do some reading. But reading is not necessarily study. Very few people really study. Reading passively indulged in will not serve the purpose here in mind. Make a vigorous attack upon some worthwhile problem; aim to understand it. Read, reflect, and experiment. There is nothing so effective in bringing growth as controlled experimentation itself.

I am here concerned with the acquiring of a better understanding of the teaching, supervising, or administering to be done. There is the problem of selecting fields of work as well as selecting methods of work. May we say just a word also about fields of work.

Most people waste time more or less on trivial things and blind alleys. Many, when it comes to school matters, have no fundamental notion of the place and purpose of the school system in the larger social organization, and consequently, often mistake the inconsequential for the important. The author has attempted to draw a picture of the place and purpose of schools in this larger social organization, with some statement of the rela-

tions of its parts, for his own guidance. You will probably not be interested in my chart but you may be interested in drawing one of your own. In any case, you will want to select something which appears to you quite fundamental for the year's study.

A Personal Diagram Might Take the Following Form



In more detail, the relationship of the various lines of study involves (I) a broad comprehensive view of the objectives of the human race, approached historically, philosophically and experimentally. From this point of view education is concerned with destinies and values, and sees man achieving in a measure his own destiny through intellectual self-direction.

This view calls for (II) a social analysis of human life in its present attainments and a continuous survey of human accomplishments, all closely related to the educational process in both its objectives and its curriculum. (III) The curriculum, then, need continuous and critical study to determine the school's contribution to social progress as directed by (a) present needs, (b) ultimate objectives, and (c) the interests and capacities of the children taught. The process is one of the continuous reconstruction of content to meet the needs of a changing society.

In the light of these relationships, educational objectives involve four distinct lines of study which are constantly interrelated. These are the individual as a person; his changing capacity through growth; the laws of education; and methods of science applied to determining goals, means of attaining goals and amounts of progress toward them.

Each of these four lines may be analyzed. The first includes (IV) consideration of individual abilities and aptitudes,—an effort to discover lines of capacity in relation to the requirements of society for purposes of guidance. It is concerned with the society load that each individual is capable of carrying. (V) Occupational analysis in relation to abilities, knowledges, skills, and ideals necessary for success in each, and, (VI) the setting up of materials, machinery, personnel, etc., needed to bring together the educational and vocational conditions required to develop individual abilities to meet occupational needs.

The second line of study includes (VII) genetic studies of mental growth; (VIII) of physical growth; and (IX) of social growth.

The third line is concerned with (X) the laws, principles, and theories of teaching which are established by scientific research. (XI) The laws of learning applicable to the school situation, determined genetically, statistically, and experimentally; and (XII) survey testing to determine how far the school attains the objectives set up in (I), (II), and (III).

The fourth line of thought is concerned with scientific methods of studying the school (XIII) statistical methods and the application of mathematics to educational data—basic to research; (XIV) experimental procedures suited to educational problems; and (XV) the development of measuring instruments needed for scientific progress in the study of education.

The application of administration and of supervision gives a new interest to these lines of work in the school organization.

A. S. B.

REVIEWS

Address all communications relative to book reviews to Editor E. J. Ashbaugh, Miami University, Oxford, Ohio.

McBroom, Maude. *The Course of Study in Written Composition for the Elementary Grades.* Monographs in Education, Iowa City, Iowa: University of Iowa, 1928. 104 pp.

In her introductory remarks the author states that: "It is believed by many educators that the outcomes in any field of study should be defined in life needs. This course of study, therefore, attempts to set forth the outcomes as expressed in knowledges, skills, abilities, and attitudes which will be necessary to enable children to meet successfully the life situations in which people use written language." (When we read we are "using written language", the author obviously means, "the life situations in which people" *write*.)

Part one of the monograph contains a full treatment of the situations calling for writing. Pupils are to be given experience in meeting all of these situations in *each* of the six grades of the elementary school. The work is to be progressive and cumulative. The expected accomplishment in knowledges, skills, abilities, and attitudes for each grade is stated in connection with each type of writing. Since letter writing is a chief type it is to be given maximum attention; but filling in forms, writing notices, announcements, advertisements, writing creatively, writing reports, reviews, summaries, directions, making notes, lists, outlines, taking dictation, and making bibliographies are also to be taught in each grade. Methods of teaching are outlined.

The second part of the monograph treats the teaching of punctuation, capitalization, manuscript forms, and grammatical and rhetorical construction. Here again methods are suggested and standards of accomplishment are set up.

The third part discusses general methods of instruction for all grades, lists topics for compositions from various fields of activity, offers informal and standard tests of accomplishment, and supplies a number of forms and models of the several types of writing, these latter to be the standards for the school.

Miss McBroom has done a good piece of work. Her book is excellently organized, and the objectives and methods are stated with clearness and vigor. Some such coherent organization of elementary composition is sorely needed. The present reviewer, however, feels that creative writing is given too little space, that letter writing and the report forms are overemphasized. It may also be contended that the average teacher using this book would tend to do just what the average teacher of composition (in whatever level of education he is found) is now doing,—to isolate form from content and to subordinate thought to technique. Only when we can get both pupils and teachers to realize that forms and techniques are merely the means not the ends of work in verbal composition, as in all other types, can we honestly hope for genuine

improvement in written expression. Until then we shall secure only empty correctness of detail,—and not much of that.

HOWARD FRANCIS SEELY
Ohio State University

MEADER, J. L. *Normal School Education in Connecticut*, New York City: Teachers College, Columbia University, 1928. vi + 96 pp.

This volume is the author's thesis, written in partial fulfillment of the requirement for the degree of doctor of philosophy. The contribution is conveyed in typical thesis style which usually implies that it is rather difficult reading.

One is tempted to say that, like all Gaul, it is divided into three parts. Part 1 deals with the establishment and organization of normal schools in Connecticut; Part 2 discusses the organization of the teacher-training program 1923-24; and Part 3 is a statistical study.

The first part of this study is a history of the slow but gradual development of education in the state of Connecticut. It describes in rather graphic fashion the early struggle to establish schools. The reader is probably more impressed than ever before with the vision of Henry Barnard and the part he has played in giving this country an educational program of some merit. His leadership is very definitely shown in this investigation. A study of this part of the thesis should result in dissipating any discouragement which we have today when we view the slow but gradual development in education. A picture of the conditions a century ago should cause us to renew our faith to continue the struggle for better educational opportunities for the youth of today. At that time, they were struggling to prepare teachers who could eradicate illiteracy. Today, we are directing our energies toward the preparation of teachers who can truly educate the youth.

By tracing the history of teacher training in Connecticut, the author has also given us an insight into practices of that day. It is easy to see that many of our present practices are but the outgrowth of the early methods of these pioneers in teacher training. Their conception of the training school and its relation to teacher training has not been greatly improved upon during the century.

Students of teacher training will probably find the second part of this thesis of most interest. It represents one of the concepts of a teacher-training program which a few of the states in the East have put into operation. It is a highly centralized organization. It places the normal schools and teachers colleges in charge of one officer, namely, the State Superintendent, who has almost absolute power. While there is no question regarding the efficiency of such a highly centralized organization, there is plenty of room for debate respecting its merits. Uniformity of training can be obtained under such an organization. There is some doubt, however, regarding the opportunity to develop initiative and leadership on the part of the teacher-training institutions under such a system. It does appear to the writer that the individuality of the teachers college is lost under this system. It is certainly a Prussian concept of teacher training rather than the democratic point of view that the states to the West have adopted. The State Superintendent and his staff determine the character of training, the limits of training, the method and procedure, and nearly every other function for which the training schools are supposed to exist. Certainly, the presidents and the staffs of these schools must feel cramped in their program. It is doubtful whether a great teachers college can ever be developed under such a system of centralization. The reader is led to wonder if Ypsilanti,

Kalamazoo, Cedar Falls, Kirksville, and Greeley could have ever developed into the splendid institutions they are if they had had to turn to the State Superintendent every time they desired to initiate a new policy. The middle and far West would, in the judgment of the writer, not tolerate such centralization of the teacher-training colleges in their states. They would not permit it because they conscientiously believe it is not best. Those who are interested in teacher-training institutions should read this study to get the point of view of a few of the states relative to this problem of teacher training. It will be well worth their time and consideration.

Part 3 of the investigation is composed of statistical studies. The teaching population of the state, the personnel of the normal school faculties, the personnel of the normal school student body, and the cost of normal school education are the topics analyzed. These facts will be interesting for comparative purposes.

This volume has been prepared with care. It represents a great deal of study on the part of the writer. It gives a very good picture of the early development as well as the present organization of the teacher-training situation in Connecticut. Those who are interested in the problem of training teachers will find it well worth reading.

H. L. DONOVAN
Eastern Ky. State Teachers College

HARRY, DAVID P., JR. *Cost of Living of Teachers in the State of New York.* New York City: Teachers College, Columbia University, 1928. vi + 184 pp.

A way of refining Professor Mort's measure of educational need is presented here. By educational need is meant a composite of all the elements affecting the cost of providing a satisfactory minimum of educational opportunity for all the children of a state. The cost of living in various communities was one of the undetermined elements in computing the educational need of a state.

The author set out to ascertain variations in the cost of living of teachers in representative communities of the State of New York, and from this knowledge to derive a technique for correcting the measure of educational need of the communities of the state. Thus the study sought an answer for one of the problems of state aid for education, since the principle of the "weighted" pupil as a measure of educational need was embodied in the New York State aid law of 1925. This law properly gave proportionately more aid to the smaller than to the larger community, but it made no allowances "for those differences in costs of the minimum program due to differences in the cost of living."

The Educational Finance Inquiry had previously shown that salaries comprise about 75 percent of the total cost of running the schools in New York State. Since cost of living determines in large measure the salaries paid, they become an important element in the measure of educational need.

The method pursued in the study was to find a measure of the cost of living of teachers, to test its reliability, and to apply this measure to the salary allowances of the minimum teacher and thereby determine more accurately than hitherto the extent of state aid demanded for meeting the educational need of the different communities. Taking for the "typical" teacher the single woman teacher living away from home, and weighting properly the five major items of her budget, viz., food, rent, clothing, savings or surplus for well-being, and miscellaneous items, an index of the cost

of living was derived by a method analagous to that used by the National Industrial Conference Board. By means of carefully defined and standardized lists, with samples in some cases, actual prices of various items comprising the budget were obtained from eighty-five cities throughout the state. These prices were secured through the coöperation of school superintendents, teachers of home economics, high-school students, and an official letter from the State Commissioner of Education accompanied the lists and assured the aid of school people. From the average of prices, an index for each division of the single woman teacher's budget, and for the cost of living in its entirety, was computed for each community, thus making it possible to correct the calculation of state aid needed to equalize educational opportunity.

The procedures are statistically sound, though admittedly in a few instances based on too few cases. To lessen the burden of future computations, an index based on thirteen articles of food (the largest item of the budget) was tested as a substitute for that based on the forty-three items of food used in the study. The index based on the smaller number was found, when compared with those compiled by the Bureau of Labor Statistics, to have predictive value sufficient to warrant its use.

There can be little doubt that this will prove a useful study, and one having wide vogue in systems of state aid derived from the measurement of educational need.

OSCAR H. WILLIAMS
Ohio State University

OSBURN, W. J. *Overlappings and Omissions in our Courses of Study.* Bloomington, Illinois: Public School Publishing Company, 1928. iv + 167 pp.

The placement of units in the various grades is an important curriculum problem. Mr. Osburn's study does not aim to solve the problem but points out specifically the overlapping of elementary, secondary, and higher education in English composition, United States history, physics and general science. Overlapping is limited to those facts which were presented two or more times in the same relations or sets. The unit of measurement used was the question and the material of study was the textbook. Each sentence in the sources on the three levels was converted into a question. The questions were then compared to discover duplication. English composition was studied in three States; United States history in four States; and physics and general science in ten States.

Mr. Osburn estimates that the amount of overlapping is equal to a whole year in about six. A large amount of the duplication is factual in character. There is a complete absence of planning in the duplication which occurs. The study includes tables giving the amount of overlapping. The major part of the monograph is devoted to a detailed enumeration of a portion of the facts which are duplicated in each subject.

From the point of view of modern curriculum making, this study emphasizes the need of solving three important problems: (1) to determine whether the period of formal education may be reduced; (2) to effect a closer relationship between elementary, secondary and higher education; (3) to provide for planful repetition of essentials, which, negatively stated, means to eliminate wasteful duplication.

The author, in my opinion, undertook too big a task. Consequently certain portions of the study are fragmentary. Many elaborate techniques are introduced in insignificant portions of the study that

take the reader off into involved by-paths. The author has a tendency to be garrulous which irritates the busy student of education. The monograph on the whole is a carefully prepared study revealing the desultory selection and placement of units of the curriculum on the elementary, secondary, and higher levels of education.

HENRY HARAP
Cleveland School of Education

CARPENTER, W. W., AND RUFI, JOHN. *The Teacher and the School.* Syllabus of a course in high school administration for teachers. Ann Arbor, Michigan: Edwards Brothers, 1928. iv + 123 pp.

This book deals with high-school administration on the teachers level in a way to initiate the new teacher and challenge the thinking of the experienced one. The volume contains a general introduction and nineteen major problems, each having to do with some phase of the teacher's responsibility. The first two problems consider the general responsibility of the teacher under laws and regulations. After these come the series of specific problems beginning with those responsibilities incident to opening of the school, and running through such responsibilities as, guidance, physical plant and publicity to the final one of closing the school year.

Each major problem contains a general statement, some questions, minor problems and a bibliography. The problems are important and the bibliography well selected. While the book is devised as a syllabus for a course it is also an excellent handbook for high-school teachers, especially for beginners.

The general aim appears to be that of making the teacher feel herself a part of the administrative staff and to lead her to assume her share in the administration of the school.

H. H. DAVIS
Ohio State University

MANGUN, VERNON LAMAR. *The American Normal School.* Baltimore: Warwick and York, Inc., 1928, xvi + 442 pp.

This book does not deal, as might be inferred from its title, with normal schools in general, or with the normal schools of the United States, but does trace the rise, growth and significance of the normal school movement in Massachusetts. Within the compass of its 442 pages, and with the help of seventeen tables and seven charts, the author has discussed and clearly outlined the main features of the history of normal school development in Massachusetts through a period of eighty-eight years "with special reference to the evolution of the state department of education."

Normal school and teachers college administrators and faculties will find in the book illuminating discussions of many of the present day administrative problems with which they are immediately concerned—problems of admission, graduation, state aid to students, normal school support, tenure and salaries of faculties, certification of teachers as related to normal school enrollment, aspects of state control, etc. But students in other fields may well be interested in the abundant source material which the author has consulted and from which he has quoted freely.

Those of us who are engaged in educational work are apt to forget our perennial obligation to Massachusetts. Mangun has made us less likely to forget that a number of principles which underlie our whole American public school system came into being there, born of much travail, stubbornly resisted, challenged often by powerful enemies, and victorious finally because a few leaders had the vision, the educational vision, without which democracy might have perished in America. The author did not

concern himself in this book with the far-reaching influence of the practices and principles whose genesis and local development he treats so admirably. Among these principles may be mentioned the state's responsibility for providing for the instruction of the whole people; that schools shall be free; that taxes shall be paid by all the people for their support; that the State has an obligation to train teachers for its schools; that the State should set the standards for its training (normal) schools; that for weal or woe the spread of universal education and the development of an adequate normal school system are problems both mutual and reciprocal of necessity.

In a very real sense Mangun has written in this volume a history of education in the United States in epitome. For whether one's immediate concern is with the schools of New England, Ohio, or the far West, he may find here an authoritative treatment of the historic beginnings, challenges and triumphs of the principles and practices that have moved westward with the "course of empire."

J. O. ENGLEMAN

Kent (O.) State Normal College

ROBERTS, LAKIN FISKE. *The Administrative Effects of Reorganization in Small High Schools of West Virginia*, University of Iowa Studies in Education. Volume IV, Number 8, 1928.

In 1925 a coöperative committee was authorized by the State Board of Education of West Virginia to study the school and curricular organization of the secondary schools of that state. The committee found a wide diversity within schools of similar size and serving communities of similar characteristics. As a result of the work of the committee specific suggestions were made as to suitable school organizations and curriculums for high schools of the different sizes and types. These proposed reorganizations were approved by the State Board of Education with the provision that the school-year of 1926-27 be a period of experimentation as to their practicability.

Dr. Roberts' study is an attempt to evaluate in as scientific a manner as possible the administrative effects of the proposed reorganization in the small high schools. The problem of the study as the author states it, "is to determine the administrative effects of the curricular changes that have been brought about by the adoption of the recommended curriculums and further to determine what administrative effects would result were the recommended uniformity in curricular and school organization of small high schools to be consummated."

To make his evaluation the author classified the small high schools, those with enrollments of fewer than 160 pupils, into four groups on the basis of size according to the size-groups for which "standard" curriculums had been set up by the committee on reorganization. By determining from available data the median situation in all the schools of a group with reference to a number of selected items he derived for each group of schools a typical school, representative of the school organization and curriculums in 1925 prior to adjustment and in 1926-27 after partial adoption of the recommended organizations. Through comparison of the typical schools in each group before and after adjustment and with the proposed "standard" it was possible to evaluate the effects of reorganization already effected and to forecast the results of complete adoption with respect to the units of difference compared. Among the items considered in determining the administrative effects were: the number of teachers employed,

the number of courses offered in the different subject-matter divisions, the number of classes in the schedule of the school, the per-pupil cost of instruction, and the per-pupil cost of activities other than instruction.

From his investigation Dr. Roberts was able to indicate with considerable degree of reliability the extent to which the different groups of schools had adopted the recommended organizations, wherein the recommended changes of the committee were operating successfully, and where modifications in the proposed program were desirable. The study has significance as showing the desirability of a factual checking up of the results of state-wide reorganization in high schools as a basis for progressive readjustment. It also offers a worthwhile method of procedure for measuring in tangible units the effects of changes in high-school curriculums and administrative organization that should be of interest and value to students of high-school administration.

EMERY N. FERRISS

Cornell University

STEPHENS, STEPHEN DEWITT. *Individual Instruction in English Composition.* Cambridge: Harvard University Press, 1928. xiii + 150 pp.

This volume, the eleventh of the *Harvard Studies in Education*, represents a serious effort to examine and interpret the plans of individual instruction in English composition that are now in use. Disclaiming any intention of attempting to show any superiority in the objective results of these methods, the author studies them in the light of certain assumed principles, maintaining an admirably impartial and judicial tone. In his preface he states that "success in individual instruction is more likely to grow from the teacher's ability to apply the technique to his own particular teaching problems than from administrative or supervisory measures," concluding further that "the healthy spread of the individual instruction idea is conditioned upon an understanding of the basic principles of individual-lesson building." These assumptions would seem to be justified; hence, if the writer has so formulated these principles that ordinary classroom teachers can grasp and apply them, he has indeed rendered a service to the cause of individual instruction, particularly in the subject under consideration.

In the first section the writer considers the function of the teacher of composition and the values of language power. These he classifies under the heads of individual and social values, making a very weak case for any of the latter that do not grow directly out of some of the former. He shows that individual instruction is not a radical departure from teaching methods of the past, but rather an adjustment of the lessons of experience and psychology to the teacher's task.

The second section is a valuable summary of experiments in individual instruction, from the St. Louis plan, as far back as 1886, to the Dalton and Winnetka plans, with their numerous variants. He shows quite clearly the growth of the conception of individual instruction and its relation to supervised study and the project method.

Section III, "The Background of Psychology and Method," is perhaps of less value to the teacher, its chief result being to show that "the basic method of procedure followed in current lessons in English composition adapted to individual progress is not a departure from former practices, but occurs in a more or less direct line of succession, as a product of the various forces that have been playing upon educational method."

In Sections IV and V the author displays and analyzes numerous assignments from many schools, covering a wide range of grades and many aspects of composition. These lessons, ranging from very good to very bad, are of much interest. They exhibit, of course, the tendency to substitute mimeographed instructions for those of a textbook or the oral directions of the teacher; they throw upon the pupil the responsibility for mastering his own problems; they demonstrate the growing notion that the classroom is a place for purposeful work rather than a place for recitation.

The writer expresses a hope that the development of research may do something to aid teachers in the making of lesson-sheets better adapted to secure results than most of those now in use. While he sees little likelihood that many schools will utilize in their entirety any of the much-advertised "Plans," he suggests the possibility that schools will adapt many of the techniques of individual instruction to their own conditions, and even that something more of flexibility may be possible under the difficult economic conditions found in public education.

At present the procedures represent the teacher's purpose at work. It may be, the writer surmises, that in time it will become possible for more of pupil-purpose to appear in the plans. The tendencies now apparent to simulate real-life situations in lesson-sheets will doubtless develop further. "We are likely to see the individual method become a flexible thing, swinging, within its range, from one form of lesson to another, and doing so with no feeling of breaking down any divisional lines. With now a self-corrected drill, now an inductive problem, now a prescription of necessary reading, now the setting of a task of memorization, and, throughout, now and then a bit of activity in preparation for work in a group....with these various uses of individual method at hand, the teacher is no longer so likely to think in terms of a single technique, or to think of the individual elements of his practice as in a wholly different category from other elements of method." H. Y. MOFFETT

University of Missouri

RESEARCH ABSTRACTS and BIBLIOGRAPHIES

Address all communications relative to research abstracts and bibliographies to Editor A. S. Barr, University of Wisconsin, Madison, Wisconsin.

ANDERSON, C. J. AND KIBBE, DELIA E. *Field Problems of Wisconsin Rural Teachers, Madison, Wis.*, State Department of Public Instruction, 1929.

This bulletin presents an analysis of 19,740 problems of rural school teachers. The problems are thrown into four major and a number of minor groups, with frequencies given for each.

SHULTZ, IRVIN TABOR. *A Descriptive and Predictive Study of a Class in a School of Education.* Philadelphia, University of Pennsylvania, 1928.

An analysis of the progress of the class of 1927, through the School of Education, University of Pennsylvania. Two hundred and fifty-six pupils entered, 1923; 155 graduated. Little correlation (.1) was found between the practice work given in the School of Education and marks given to these same people by superintendents after two years of teaching experience. Previous school marks are found to be the best criteria for the prediction of persistence in school. A group intelligence test alone is not a safe criterion for admitting students. Students with low intelligence score may make a passing mark in scholarship, but, in order to obtain a high scholarship mark, the student must have a high intelligence score.

STANTON, HAZEL M. *"Prognosis of Musical Achievement," Studies in Psychology*, Rochester, N. Y., Eastman School of Music, The University of Rochester, 1929.

A five-fold classification of safe, probable, possible, doubtful, and discouraged was made of students in the Eastman School of Music, Rochester, N. Y., for the entering at classes of 1925, '26 and '27—a total of 351 students. The classification was made at the end of the first semester on the basis of class marks, teachers' talent ratings, and two tests, namely, the Seashore Measures of Musical Talent and the Iowa Comprehension Test, a non-musical test. The percent of survivors clearly indicate the predictive value of the measures used. For the class of 1925, the discouraged group had zero percent continuing the third year; the doubtful group had 19 percent continuing the fourth year; the possible group had 40 percent continuing the fourth year; the probable group had 44 per cent continuing the fourth year; and the safe group had 54 percent continuing the fourth year.

SMITH, HENRY LESTER AND CHAMBERLIN, LEO MARTIN. "An Analysis of the Attitudes of American Educators and Others Toward a Program of Education for World Friendship and Understanding," *Bulletin of the School of Education, Bloomington, Ind.*, Indiana University, March, 1929.

A questionnaire study based upon a

relatively liberal sampling of the attitudes of American educators and others toward a program of education for world friendship and understanding. The analysis of these data is presented in some sixteen tables.

SMITH, HENRY LESTER AND CRAYTON, SHERMAN GIDEON. "Tentative Program for Teaching World Friendship and Understanding in Teacher Training Institutions and in Public Schools for Children Who Range from Six to Fourteen Years of Age," *Bulletin of the School of Education*, Bloomington, Ind., Indiana University, May, 1929.

A bulletin outlining a tentative program for the teaching of world friendliness and understanding based upon the conclusions reached in a companion study, "An Analysis of the Attitudes of American Educators and Others Toward a Program of Education for World Friendship and Understanding."

"Character Building: Principles and Suggested Procedures." *Kansas City School Service Bulletin*, Kansas City, Mo., April, 1929.

A report of a special committee of Kansas City teachers, principals, and supervisors containing a statement of objectives, psychological principles involved in character building, practice and procedures, a self-testing plan, a suggested program of activities and a bibliography.

"Report of the Committee on Guidance." Pittsburgh Principals' Club, *Pittsburgh Public Schools Bulletin*, Pittsburgh, Pa., Board of Public Education, June, 1929.

A report by the Pittsburgh Principals' Club covering the objectives, methods, and responsibilities of various agencies in health, social, ethical, educational, and vocational guidance.

"The Duties of Nebraska High School Directors of Physical Education and Athletics." *University of Nebraska Publication*, Educational Research Record I, No. 58, April, 1929.

A questionnaire study based upon returns from 141 high schools in the state of Nebraska. Data are presented on where the directors were trained, their professional training, titles, physical facilities supplied, duties of coaches and directors, subjects and combinations of subjects taught, salaries received, tenure, etc.

"The Seven Year System." *Kansas City School Service Bulletin*, Kansas City, Mo., Executive Department of the Kansas City Public Schools, September, 1929.

The purpose of this study is to evaluate the 7-year elementary school system as used in Kansas City. The author concludes that the 7-year plan saves time, that the work done is of excellent quality, that many pupils continue their course beyond the elementary school level, that pupils are enabled to enter school and college at an earlier age, and that graduates of the Kansas City Schools do excellent work in higher institutions of learning.

"The Testing Program of the Elementary Grades, Year 1928-29." *Bulletin*, Beaumont, Texas, Beaumont Public Schools, 1929.

An analysis of the results from the Stanford Achievement Test for 1767 elementary school pupils from grades two to five.

EXPERIMENTAL STUDIES REPORTED IN CURRENT ISSUES OF OTHER MAGAZINES

PSYCHOLOGY OF LEARNING

ABELSON, HAROLD H. "Achievement of Dull Pupils Under the Dalton Plan," *School and Society*. xxx, (August 10, 1929), 211-212.

This report is based upon the study of a group of 169 pupils in the sixth grade at Public School 39, Bronx, New York. The Stanford Achievement Tests, the National Intelligence Test, and the Haggerty Intelligence Test, Delta 2, were used. The Dalton plan, according to the author, is about as effective in teaching the school subjects to duller pupils, if not more effective, as to brighter pupils.

BILLS, ARTHUR GILBERT AND BROWN, CLARENCE. "The Quantitative Set," *Journal of Experimental Psychology*. xii (August, 1929), 301-323.

One of the most important factors determining the level of efficiency which an individual may attain in mental work is the attitude or set which he brings to the task. There are innumerable kinds of set. The aim of the investigation was to determine to what extent an individual's efficiency is influenced by the amount of work with which he is faced. It seems from this experiment that the greater the amount of work the higher the initial level of efficiency.

ECKERT, MOLLIE HORTON. "The Importance of Context in Reading," *School of Education Journal*, University of Pittsburgh. iv, (March-April, 1929), 97-102.

The investigation is of the equivalent group type in which 125 paired cases are used. The author concludes that context generally aids pupils in the comprehension of difficult or unfamiliar words. Pupils of superior reading ability gain more from context than those of mediocre or inferior reading ability.

OTIS, MARGARET. "Improvement of Feeble-Minded Girls Over 16 Years of Age," *The Journal of Applied Psychology*. xiii (June, 1929), 301-315.

Feeble-minded girls over 16 years of age may be trained by means of reading and book work so that their language improves. Training in reading and book work affects the results of the Binet-Stanford tests. Many girls who do not test high because of lack of training in language are called feeble-minded and sent to institutions on account of economic conditions or sex difficulties. Such cases are improvable.

FREEMAN, FRANK S. "Elusive Factors Tending to Reduce Correlations Between Intelligence Test Ranks and College Grades," *School and Society*. xxx, (June 15, 1929), 784-786.

Shows that with time spent in study, effort, physical efficiency, etc., are held constant that higher correlations result.

FULLER, FLORENCE D. "Achievement of Slow Pupils in Arithmetic," *Educational Research Bulletin*, Los Angeles City Schools. viii, (May-June, 1929), 2-5.

Data are presented to indicate that a considerable number of pupils of low mentality are above normal in achievement in arithmetic.

KAULFERS, WALTER VINCENT. "Effect of the IQ on the Grades of One Thousand Students of Foreign Languages,"

School and Society. xxx, (August 3, 1929), 163-164.

Intelligence, according to the author, is a significant influence upon pupil achievement in Spanish as measured by teachers' marks. Only pupils of superior habits of work with low IQ may expect to succeed. The foundation acquired in the subject itself as the pupils progress from semester to semester increasingly becomes a factor in achievement.

RENWICK, E. M. "Children's Difficulties in the Study of Mensuration," *The Forum of Education.* vii, (June, 1929), 106-120.

The writer describes the special methods which she adopted in order to give precision to her pupils' conceptions of length, area, and volume, as distinct physical properties of lines, surfaces, and solids, different in kind, and requiring different units for their measurement. A very interesting article.

TINKER, MILES A., AND PATERSON, DONALD G. "Studies of Typographical Factors Influencing Speed of Reading," *The Journal of Applied Psychology.* xiii, (June, 1929), 205-219.

A review of previous work and opinion on the influence of line length on speed of reading shows that for the most part short lines are favored over long ones. These results are difficult to interpret because, generally, there has been a failure to specify the size of type used. The speed of reading in this investigation was obtained for texts set up with lines 59, 80, 97, 114, 136, 152, 168, and 186 mm. in length with size of type kept constant at 10 point. Comparisons were made between the 80 mm. lines and each of the other lengths of line. There were 560 college students used in the experiment. The texts in 59, 97, 114, 136, 152, 168, and 186 mm. were read more slowly than the text in 80 mm.

EDUCATIONAL AND VOCATIONAL GUIDANCE

CRIDER, BLAKE. "The Effect of Absences on Scholarship," *School and Society.* xxx, (July 6, 1929), 27-28.

As the number of absences increase the average number of grade points decrease.

GOLDTHROPE, J. HAROLD. "The Relative Rank in High School and in the First Two Years of the University," *School and Society.* xxx, (July 27, 1929), 130-134.

From the data presented in this study there appears to be a substantial relationship between high standings in High School and standings in the first two years of University.

SIMS, VERNER MARTIN. "A Comparison of Normal School Students With Certain Other Groups," *School and Society.* xxx, (July 13, 1929), 68-70.

A comparison of 67 women enrolled in the two-year normal course at the Louisiana Polytechnic Institute and 92 enrolled in the different four-year college courses as to intelligence, scholarship, socio-economic and cultural levels.

CURRICULIUM RESEARCH

HATHAWAY, GLADYS M. "Purposes for Which People Read: A Technique for Their Discovery," *School of Educational Journal,* University of Pittsburgh. iv, (March-April, 1929), 83-89.

The purpose of this investigation was to try out a new technique for the discovery of the purposes for which people read. The technique was based upon

analysis of the words included for definition in 350 pages of Webster's *New International Dictionary*. The method by which these words were studied involved five steps:

1. Note word and definition carefully.
2. Note human activity suggested by the term.
3. Note how reading serves as activity.
4. Note purpose of reading thus revealed.
5. Record the term and the purpose revealed.

The author gives certain evidence to indicate that this particular technique is superior to that ordinarily used in locating the purposes for reading.

MONTGOMERY, WILDA LEA. "An Investigation of the Uses of Recreatory Reading," *School of Education Journal*, University of Pittsburgh. iv, (March-April, 1929), 90-91 and 103.

A study based upon personal interviews with 176 individuals and further information obtained from 234 normal school students through the coöperation of their teachers. The results are summarized in a table giving the percent of each occupational group mentioning each of ten uses of recreatory reading.

WEBB, HANOR A. "The High-School Science Library for 1928-1929," *Peabody Journal of Education*. vii, (July, 1929), 21-36.

A valuable list of books on high-school science.

TESTS AND MEASUREMENTS

BALL, ROBERT JAUDON. "An Objective Measure of Emotional Instability," *The Journal of Applied Psychology*. xiii, (June, 1929), 226-256.

A study of kinaesthetic motor learning among juvenile delinquents through the use of a high relief finger maze which shows that there are certain definite characteristics in the learning curve peculiar to boys of unstable emotional makeups.

BROWN, RALPH. "Minimal Essentials in Statistics," *University of Nebraska Publication*, Educational Research Record. i, (February, 1929), 99-103 and 107-109.

The purpose of this investigation was to determine the amount of statistical knowledge really necessary for the intelligent reading of educational periodicals. A list of the statistical terms found in 15 periodicals, with the frequency of their occurrence, is given.

BROOM, M. EUSTACE. "A Critical Study of a Test of Extroversion-Introversion Traits," *Journal of Juvenile Research*. xiii, April, 1929.

This study presents data concerning the Laird Personal Inventory C-2 for 391 students. There is no appreciable sex difference in extroversion and introversion. The reliability of the test is low, but its validity relatively high.

THURSTONE, L. L. "Theory of Attitude Measurement," *Psychological Review*. xxxvi, (May, 1929), 222-241.

A very interesting article proposing a method for the measurement of attitudes. The procedure described supplies a much needed technique for measurement in this field.

NEW TESTS

Badger Standard Tests in Fundamental Mechanical Drawing, by Alex J. Badger, Lincoln High School, Los An-

geles, Cal. Published by the Public School Publishing Co., Bloomington, Ill.

The subjects covered in this new series of tests are:

Test 1—Use of tools, linework, dimensioning, lettering;

Test 2—Projection, including sections and auxiliary views, and;

Test 3—Pictorial drawing (isometric, cabinet, oblique).

Price: $2.00 (plus postage) per package of 25 copies each of Tests 1, 2, and 3, one teacher's manual, and one class record sheet. Sample set (including all tests, manual, and record sheet), 20c

A Self-Rating Scale for Supervisors, Supervisory-Principals, and Helping-Teachers, by Edwin J. Brown. Published by the Bruce Publishing Co., Milwaukee, Wis.

The Scale contains fifty items grouped under the main heading: (1) Personal and Social Qualities; and, (2) Methods and Principles. The items listed are based upon a survey of textbooks in the field of supervision.

Sammartino-Krause Standard French Test, by Peter Sammartino and Carl A. Krause, Jamaica High School, New York City. Published by the Public School Publishing Co., Bloomington, Ill.

This test covers vocabulary, grammar, and comprehension. The *vocabulary* section is composed of words picked from nine standard textbooks in French. These words were then checked with Henmon's "French Word Book" (which gives the frequency of words used in 400,000 French running words), with Ward's "Minimum French Vocabulary Test Book," and with Wood's "Comparative Study of the Vocabularies of Sixteen French Textbooks."

The *grammatical* items were derived from nine French textbooks and each item is common to all of these books.

The *comprehension* test is meant to test comprehension and that only.

Price: $1.50 (plus postage) per package of 25 copies each of Parts I and II and one direction sheet. Sample set (including Parts I and II and direction sheet), 15c.

MISCELLANEOUS

CROSBY, SARAH B. "A Study of Alameda County Delinquent Boys, with Special Emphasis Upon the Group Coming from Broken Homes," *The Journal of Juvenile Research*. xiii, (July, 1929), 220-230.

A study of the case records of 314 boys appearing before the Alameda County juvenile court for the year 1926. Forty-five and five-tenths percent of these cases were from broken homes, and 50.6 percent were from unbroken homes. The study presents data on: (1) age of the boys; (2) charges made against each; (3) the educational status of each; (4) the employment record, and (5) the final disposition of each case.

NEWS and COMMUNICATIONS

Address all research news and communications to Editor V. T. Thayer, Ethical Culture Schools, 33 Central Park West, New York City.

Hutchinson's Latin Grammar Scales, Forms A and B

Hutchinson's Latin Grammar Scales are constructed in two parts. Part I is a test for knowledge of case constructions; Part II, a test for knowledge of mood construction. It is of the multiple choice type.

The validity of this test is based upon correlations between a composite score secured from a number of other tests and the Hutchinson scales. The test items are ranked for difficulty, the pupils' score being the difficulty value at which half the tasks attempted can be successfully done.

The reliability of the test, based upon correlations of the two forms is .854 ± .008. The scoring is objective. These scales are published by the Public School Publishing Co., Bloomington, Ill.

The Measurement of Social Intelligence

Recognizing that intelligence is not only of the abstract variety, but may be distinctly of the mechanical variety or the social variety, this study was undertaken to find out more about the latter variety—social intelligence or the ability to deal with people.

After studying the various qualities and traits making up social intelligence, an objective test[1] for measuring these was constructed. The six parts included are: 1. Judgment in Social Situations, in which the individual taking the test is presented problems in social relationships, and for each, four suggested solutions from which he must choose. 2. Memory for Names and Faces in which a dozen faces and names presented at the beginning of the test must be identified later in a larger group. 3. Recognition of Mental States from Facial Expression, in which the mental states must be recognized from the expressions as portrayed in pictures. 4. Observation of Human Behavior in the form of a true-false test. 5. Social Information in the form of a true-false test. 6. Recognition of the Mental States Behind Words in which the individual taking the test must recognize the mental states behind various quotations from literature and current speech. The test is a 160 point test taking about 45 minutes to give.

The reliability coefficient for the Social Intelligence Test is .89. Its validity as a measure of social intelligence is indicated by the following: first, a correlation of .61 between test scores and ratings by superior executives with ability to deal with people, in the case of 98 employees of a large sales company; second, by fairly high correlations between test scores and social intelligence ratings of students made by fraternity members and teachers; third, by differentiation to the extent of a difference of 17 in score averages between college freshmen who are non-participants in extra-curricular activities and those who participate in

[1] This test is published by the Center for Psychological Service, 2024 G St., N. W., Washington, D. C.

several campus activities; and fourth, by the fact that in vocational use and study of the test, those in positions requiring tact in dealing with people have consistently shown higher scores than those in positions where this quality is not important.

In studying the relation of social intelligence to other factors, the following have been noted: There is a positive relation to abstract intelligence and success in school. There is very little relationship to mechanical intelligence. Women show a slightly higher social intelligence than men. There is a significant relationship between social intelligence and success in various vocations.

Norms are available on the test for the various school levels, and on a limited number of cases for the following vocational groups: administrative and executive employees, teachers, secretarial employees, clerical employees, salesmen, engineering employees, office helpers, policemen, nurses, and low grade industrial workers.

THELMA HUNT
George Washington University

THE SOCIALIZED RECITATION IN GENERAL SCIENCE

The following investigation is a study of the socialized recitation method of teaching. A survey was first made of the literature on the socialized recitation to obtain statements of objectives and methods of procedures. The socialized recitation was defined upon the basis of these statements.

The experiment was conducted in general science in the seventh grade of the public school at Fond du Lac, Wisconsin, and consisted of a comparative study of the socialized recitation and the directed study method. The equivalent group method of experimentation was used. The classification of pupils into two groups was made from a composite score based upon the pupil's IQ, his ability to read, and his test score in science and nature study. Thirty-four cases were matched. Both groups were taught for eighteen class hours in the same room by the same teacher. The unit of work studied was health-science. Table I shows the averages for the two groups.

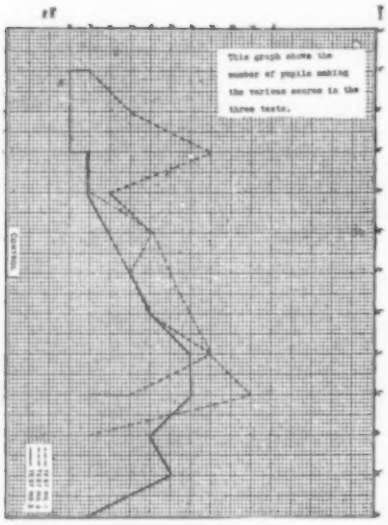
TABLE I

	Control Group Mean Score	Experimental Group Mean Score
IQ	100.9	103.8
Reading Score	162.2	162.08
Science and Nature Study Score	49.46	46.8
Composite Score	231.1	231.2
Chronological Age	12.11	12.7
Educational Age	12.9	12.11

In the control group, directed study with a minimum amount of discussion was used. There was very little teacher or pupil talk. One-half of each period was spent in reading and the other half in filling out study outlines, in making drawings, and in writing out exercises.

In the experimental or the socialized study group no written work was done. The major portion of the time was given over to discussion. The reading, for the most part, was done during the first half of the experimental period. The discussion was done by the class. The coöperative efforts of the class took on various forms ranging from simple methods, such as the volunteering of contributing statements, to more complex forms, such as the giving of topical reports, the organizing of group contributions, and the organizing of a debate.

The following measurements were made for each group: (1) achievement, (2) interest, and (3) attitude. The test of achievement was a combination of No. 9 and No. 10, Series A, of the General Science Examination of the Wisconsin



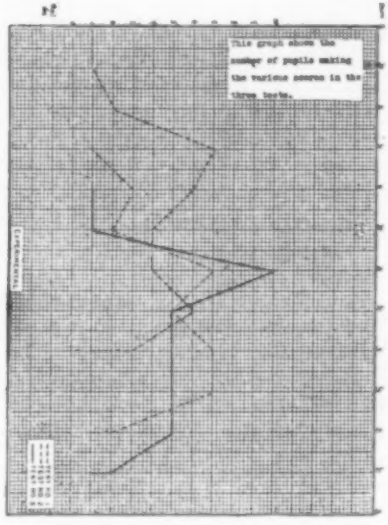
CONTROL GROUP

State Department of Public Instruction. This test was given to both groups at the beginning, middle, and the end of the experimental period. These data were used to compare rates and amounts of progress. Table II shows the results of the tests and the following graphs illustrate the progress of each group.

TABLE II

Test No. 1	Control Group	Experimental Group
Group average (mean)	49.1	45.7
Sigma (dis)	12.0	10.55
Standard Error	2.04	1.81
Probable Error	1.375	1.200
Test No. 2		
Group average (mean)	57.8	57.2
Sigma (dis)	8.5	8.60
Standard Error	1.46	1.47
Probable Error	.984	.991
Gain of Test 2 over Test No. 1	8.7	11.5
Test No. 3		
Group average (mean)	62.7	60.1
Sigma (dis)	12.20	8.55
Standard Error	2.07	1.46
Probable Error	1.396	.984
Gain of Test 3 over Test No. 2	4.9	2.9
Total gain, Test No. 3 over No. 1	13.6	14.4

The significance of the difference in the averages was determined by finding the critical ratio. The accepted standard for the significance of an obtained difference is that the difference shall be at least four times the probable error of the difference. Table III shows these data.



EXPERIMENTAL GROUP

TABLE III

	No. 1 Test	*No. 2 Test*	*No. 3 Test*
Differences of averages (mean)	3.4	.6	2.6
Probable Error $_{Diff}$	1.82	1.36	1.70
Diff. ÷ P.E. $_{Diff}$	1.85	.44	1.53

From these data it may be concluded, that while the socialized study group showed some gain over the directed study group, the differences were not statistically significant.

It was found, however, in the examination of individual cases that there were 19 instances in which the socialized recitation method proved superior to the more socialized procedure. Also the total points of gain for the socialized recitation group had an advantage of 59 points.

The measurement of interest was based upon an activities record. At the beginning of the experiment both groups were instructed to keep a record of all the things they did, saw, heard, read, or experimented with, which were in any way connected with their science work or which made them think of it. No home work was required from either group but this device was employed to get pupils to make applications and to arouse interest. These activities were scored according to the number of things listed. While it is recognized that such a method is not without shortcomings, certain additional facts were brought out.

It was found that only 76 percent of the control group took advantage of this as compared with 94 percent of the experimental group. Out of the 34 matched pairs there were 14 instances in which the socialized recitation group had the advantage and 11 instances in which the directed study group had the advantage in the number of activities reported. In tabulating points of gain the socialized group held an advantage of 462 points over the directed study group. The results obtained from this part of the study indicate that the socialized recitation method stimulates a greater amount of interest in the work.

The third measurement was one of attitude toward the work. It was given in the form of a questionnaire, and consisted of ten questions which could be answered definitely one way or the other. The results obtained from this questionnaire would indicate that pupils prefer socialized recitation methods of learning. Space will not permit a presentation of these data.

General summary of findings:

(1) Authors vary widely in statements of objectives and methods of procedures of the socialized recitation.

(2) The amount of recent material printed and available to teachers on the socialized recitation is extremely limited.

(3) While the socialized study group showed more gain in the matter of getting information, the differences were not statistically significant.

(4) The socialized recitation group showed greater and keener interest in the subject-matter as measured by an activities record.

(5) Pupils prefer a discussional method of learning.

GRACE PEEBLES
Fond du Lac, Wisconsin

REPORT OF A READING STUDY BY THE NEW JERSEY STATE COUNCIL OF EDUCATION

During the second half of the school year in 1927 the New Jersey State Council of Education made a study of reading in the fifth grade classes representing a cross-section of the schools of the State of New Jersey. This study was made under the direction of Sidney G. Firman.

The report includes the results of the tests given to 2955 fifth-grade pupils in 32 school systems. South Orange and Nutley tried out the tests and found the second more difficult than the first; consequently, 1.5 was added to the comprehension score of that test and 10 to the rate.

A careful study was made of 100 subject-matter test sheets to determine, if possible, whether there was any difference shown by pupils in comprehending material in history, geography, or arithmetic. There was practically no difference. The percentage of mistakes was about the same in all three groups.

The reading study was undertaken to determine, if possible, whether a gain in reading power in a given grade during a

given period of time results in a corresponding gain in power to interpret the regular subjects of the grade. No tests given under uncontrolled conditions can be conclusive, but the pupils gained much more, both in rate and comprehension, in ability to read the material in their arithmetic, geography, and history textbooks than they did in ability to read the material that is usually found in the reading textbook.

The time spent on ordinary reading material seemed to be largely wasted, either because the pupils read without a purpose, (the reading period was largely a rest period in which the teacher merely listened to the oral reading of the pupils and told them the pronunciation of difficult words), or there was lack of proper incentive in silent reading.

The gain in reading the subject matter of textbooks was gratifying, but the test papers showed that much better results could have been obtained if the teachers had devoted more time to teaching the technical vocabularies of the different subjects.

Before the tests were begun, the following numbers, representing minutes and seconds, were written on the blackboard.

1			
2			
3	4	5	6
3-5	4-5	5-5	6-5
3-10	4-10	5-10	6-10
3-15	4-15	5-15	6-15
3-20	4-20	5-20	6-20
3-25	4-25	5-25	6-25
3-30	4-30	5-30	6-30
3-35	4-35	5-35	6-35
3-40	4-40	5-40	6-40
3-45	4-45	5-45	6-45
3-50	4-50	5-50	6-50
3-55	4-55	5-55	6-55

As the test proceeded the numbers were erased in order. A pupil was told to complete the test and then write at the end of the test sheet the number that would be erased next. That gave the time of the test. It seems probable that a plan similar to this could profitably be used for timing many tests.

SIDNEY G. FIRMAN
Glen Ridge, New Jersey

ARE WE ACHIEVING OUR MAJOR AIM IN PHYSICS TEACHING?

In view of the general acceptance of the pragmatic aim in the teaching of physics and the emphasis placed upon that aim lately by teachers as well as textbook writers, it should be interesting to examine the ability of those who have completed the high-school course with regard to this aim. It is the purpose of this paper to make such an examination and to draw some conclusions therefrom. With respect to these conclusions, it should be remembered that an investigation involving a larger number of pupils might render some of these conclusions untenable.

For several years the writer has been interested in the construction of physics tests having for their primary purpose the testing of the pupil's ability to make the principles learned in physics serve him in a better understanding of their various applications. The test used in this study was a test in mechanics. It consisted of fifty questions and was constructed in such a way that it had a rather high degree of objectivity.

That portion of the test which was intended to test the pupil's ability to associate laws with their applications was arranged in the following manner. At the right of the page there were ten laws selected from mechanics. Among these were Newton's three laws of motion, the principle of Archimedes, Pascal's principle, Newton's law of gravitation, and Boyle's law. These laws were stated in full with the exception of Hooke's law of elasticity and Newton's law of gravitation. These were listed by name only.

At the left of the page and opposite these laws there were twenty questions each involving one of these laws. The pupil was instructed to read the question, examine the laws at the right until he found the one which was involved in the question, then place the number of that law in the square preceding the question. For example, the first question was, "Automobiles tend to skid when turning corners. To which law at the right is this due?" The pupil examined the laws at the right till he came to Newton's first law of motion stated thus: "A body in motion continues in motion in a straight line unless acted upon by some external force." Recognizing this as the principle involved he noted the number of this law and placed it in the square before the question.

The following analysis of results on this part of the test is based on one hundred responses chosen from two city high schools each having first-class physics departments. Only ten percent of the pupils failed to associate Newton's first law of motion with the skidding of the automobile on a curve. On the other hand thirty percent failed to see that it is the same principle that keeps a rolling disk or hoop upright as long as it stays in motion. Twenty percent of these pupils could not see any connection between the standpipe for water supply and the important principle that pressure in water is proportional to depth or height and to sixty-seven percent of them there was no apparent relation between the same principle and the mercury barometer. To twenty-six percent of them the spring scales did not suggest Hooke's law of elasticity and eighty-five percent saw no application of Boyle's law in the pneumatic tank used for water supply. The fact that only twenty-six percent failed to see this law involved in the inflation of an automobile tire would indicate that their failure in the case of the pneumatic tank was due to ignorance of the use of such tanks rather than to a failure to understand Boyle's law. In the case of a stopper being forced into a filled bottle and bursting it only eight percent failed to see that Pascal's principle applied while twenty-three percent did not recognize the hydraulic press as an application of this principle.

In general pupils scored highest on this part of the test. Twenty-nine percent of the answers, however, were wrong, which leads to the conclusion that much remains to be done before pupils get a maximum of value from physics if that value is to be measured by their ability to use physical laws and principles in the interpretation of life situations. It should also be noted that they were not required to remember laws, like these which were, with two exceptions, written in full. All that was necessary for the pupil to do was to read the laws and understand their meaning and to associate these meanings with the applications which they would explain. Obviously it was easier to make such associations than it would have been to explain these applications in terms of physical principles to be recalled and stated by the pupil.

Failure to associate the principles of physics with their common applications might be accounted for in at least two ways. First, it might be due to a lack of emphasis upon the applications of physics. If physics is considered as a body of laws, formulas, and definitions which must be learned and reproduced by the pupil and if that ability to reproduce becomes the primary aim, then the real meaning and importance of physics as applied in the modern world may fall short of realization. Without a doubt much of the failure of high-school sci-

ence in the past was directly attributable to such practice. At present the emphasis is being shifted, and wisely no doubt, from the mastery of subject matter as a major aim to the ability to make use of subject matter in more intelligent and more efficient living. In this shift of emphasis it may be possible that the pupil's failure to apply physical laws is due to a failure on his part really to understand the law. It may be that the teacher, in an effort to study many applications, has permitted the course to become a browsing around among a great many things of interest with no effort to see in these applications a few underlying principles.

Whatever may be the cause of the pupil's failure to use his knowledge, an examination of the responses of the same group of pupils to questions testing their understanding of physical principles should be of interest here. The group of questions used for this purpose was made on the assumption that physics is primarily quantitative and involves mathematical relationships. An examination of the laws which constitute the bulk of physics will disclose that they are nearly always statements of mathematical relations between variables. For example, we are concerned very much with the relationship which exists between the tendency of an automobile to skid and its velocity. One of Newton's greatest discoveries was the relationship, or lack of it, existing between the mass of a body and the velocity of its fall to the earth. Archimedes' principle is a statement of equality of the buoyant force acting on an immersed body and the weight of the displaced liquid. Hooke's law states the relation between the distortion of an elastic body and the force that causes this distortion. In all sorts of waves the quantities wave length, frequency, and velocity bear a definite relation to each other. Ohm's law in electricity is a simple statement of the interrelation of current, voltage, and resistance. All physics is not so highly quantitative, but much of it is. The assumption made in the questions of this group is that the essential thing in these laws is the relationship. The group was therefore constructed as follows: At the left of the page twelve laws considered important in mechanics were stated, only the relation words being omitted. At the right of these laws there was a list of words and groups of words which expressed the required relations when properly chosen. These groups were :"(1) Equal to, (2) Independent of, (3) Directly proportional to, (4) Inversely proportional to, (5) Directly proportional to the square of, (6) Inversely proportional to the square of, (7) Directly proportional to the square root of, and (8) Inversely proportional to the square root of." Newton's law of gravitation was stated: "The attraction between two bodies is ....the product of their masses and.... the distance between them." If the pupil understood this law it was an easy matter for him to select the group of words that expressed the true relation and indicate his choice by inserting the number of that group in the blank. In the group were the law of machines, laws of the pendulum, the law of gravitation, laws of falling bodies, the relations between pressure in a liquid and height, and the relation between pressure and density of the liquid. In all there were twelve blanks to be filled.

Of a hundred pupils, seventy had not observed that the distance traveled by a falling body is proportional to the square of the time. The same number did not know that, in the same case, the velocity would be directly proportional to the time. Fifty-seven percent did not obtain

the correct relation between time and distance traveled in the case of uniform motion, and fifty-two percent failed in expressing the relation between pressure and height in a free liquid. In this group forty-eight percent of the answers were correct as compared with seventy-one percent in the preceding group.

It should be noted that the questions of this group are more difficult than those of the first. For example, a pupil might have a faint memory that the hydraulic press was somehow related to Pascal's principle without being able to supply the relation expressed in Pascal's principle. Nevertheless it seems evident from the results that pupils do not master these laws in the sense of understanding or appreciating the relationships. Furthermore, it seems safe to say that a goodly portion of their failure to apply these laws may be accounted for by the fact that they did not really understand them. For example, the failure of sixty-seven to associate the mercury barometer with the pressure-height law is almost entirely accounted for by the failure of fifty-two to insert the correct relation words between those two variables. Twenty-one percent did not associate Hooke's law of elasticity with the spring scales and approximately the same number, twenty-three, did not insert the true relation group in Hooke's law. An apparent lack of agreement occurs in the case of the law of gravitation, about half completing the statement of the law whereas ninety-two were able to apply it. Further comparisons cannot be made since the laws to be completed were not the same as those to be applied except in the cases already mentioned.

A final group in the test consisted of ten problems. These problems were made to test the pupil's understanding of physical principles rather than his ability to make computations. For example, in the following problem the computation is simple: "What force will be necessary to roll a barrel weighing 200 pounds up a plane 12 feet long and 3 feet high? (Neglect friction.)" If the pupil understands the inclined plane as taught in physics he will know that the force will be such a fraction of the weight as the height of the plane is of the length, that is, $3/12$ or $1/4$, and $1/4$ of 200 is 50. Some of the problems such as the above, could be worked without pencil. None of them required more computation than could be done easily on the margin of the paper.

According to the scores made on this problem test it was the most difficult part of the test, the average score being forty-five percent. In the case of the problem above forty-nine percent of the answers were wrong. The fact that the problems constituted the last ten questions of the test probably accounts for part of the poor showing made by pupils. The time for the test, however, was thirty-five minutes which seemed to be ample time. It is more likely that simple problems not involving large numbers or complicated solutions make the severest and most effective test of the pupil's understanding of the laws of physics.

In general it may be said that these pupils show a fair degree of ability to make simple association between the stated principles of mechanics and the applications involving those principles; that, considering the nature of the questions in this group and the simple associations to be made, the responses do not indicate the degree of ability that might reasonably be expected; that the ability to make these associations varies widely with the different laws and the nature of the applications. The success in applying laws is much more limited in the case of

laws that are highly quantitive such as Newton's law which states that force is proportional to the change in momentum which it produces. That even this difficult and fundamental law can be understood by high-school pupils if presented in simple familiar applications is indicated by the fact that only fourteen percent failed to see it applied in the "pick up" of an automobile whereas fifty-two failed to associate it with the meaning of the dyne and the absolute measurement of force. There is some evidence to indicate that pupils learn to associate laws with special laboratory apparatus but fail to associate them with common practice outside the laboratory. For example, nearly four times as many pupils failed to associate Archimedes' principle with buoyancy in swimming as with a common laboratory application of the principle.

Perhaps the greatest single benefit that has been derived from the modern testing movement is the light that this testing has thrown upon teaching procedure, or rather the results of teaching procedure. Tests have shown that much, which was formerly taught in arithmetic was not really learned by the child, or at least by a very large percentage of the children. Vocabulary and reading tests have disclosed that textbooks placed in the hands of pupils contained many words and ideas beyond their comprehension. They have shown that some of our notions of how pupils learn were wrong. It is beyond the scope of this paper to make any suggestions with reference to method or procedure for a more usable understanding of the subject matter of physics on the part of pupils, however the need for such may be suggested by the results of the tests reported here. A more obvious inference is that there should be more investigation into the problem of how pupils learn, or do not learn, physics. A more extensive investigation of this problem might throw light on the dark spots of our present procedure which would enable us to correct some of our errors and enable us to give our pupils habits of thought and understanding of fundamental principles that would really serve them in understanding and using their physical environment.

A. W. STEWART
Kent, Ohio, State Normal College